POPULAR Computing WEEKLY

35p 12-18 May 1983 Vol 2 No 19

This Week

News Desk

Virgin plans games release

VIRGIN Games is planning to release eight programs in time for the Earl's Court Computer Fair June 16-19.

Four of the programs are for use with the Sinclair ZX Spectrum. Nick Alexander, head of Virgin Games, said the programs included an arcade style game, a graphic adventure and a golf simulation.

Three of the remaining four programs are for the BBC micro. They consist of an original arcade type game, a Mars lander simulation and a graphic adventure.

The final program is an arcade game for the Vic20.

All eight programs will be priced at £7.95 and will be launched officially on June 14. The games will be available initially through retail chains — Nick Alexander hopes to distribute the games through record shops later.

Virgin plans to release further software in September and will cover an expanded range of machines, including

Continued on page 5

Memotech debut at computer fair

MEMOTECH is to launch a new low-cost micro at the London Computer Fair next month. It will feature a professional-style keyboard with 16 user-definable functions, and the ability to Run CP/M software.

So far the Oxfordshire-based company has specialised in enhancing Sinclair machines. Demand for its ZX81 keyboard convinced Memotech that a quality keyboard was an "essential", according to Robert Branton who is developing software in-house for the new machine.

He added that the need to have software readily available has prompted Memotech to launch disc drive systems at the same time as the machine.

Both 5¼ and 8 inch versions will be available, allowing buyers to use CP/M software. As Branton said: "If somebody buys this system, software is guaranteed."

Details of pricing are not yet available, but the machine will

Continued on page 5

Head of Virgin Games, Nick Alexander



Continued on page 38

★★ADVENTURE COMPETITION—WIN A 64★★



WINDOW ON ANOTHER WORLD
Cruise through the deepest reaches of space in a life or death struggle to decide the fate of the galaxy. Match wits with mighty mages in the final battle for supremacy of the planet Xarg. Test your driving skills on the tracks at Monte Carlo and Monza. Or just relax on a Sunday afternoon with a round or two at your local golf course.
Salamander Software offers a wide range of games for the Dragon 32, BBC Model B, Oric 1 and Tandy 32K microcomputers. Whatever your age, whatever your taste Salamander Software has the program for you! See us at the Midland Computer Fair Birmingham April 28-30
"Why can't all software come up to this standard?" Computer and Video Games
DRAGON 32 and TANDY 32K (please specify)
Dragon Trek £9.95 Wizard War £7.95 Golf £7.95 Grand Prix £7.95 Vulcan Noughts & Crosses £7.95 Games Comp D1 £7.95 Salamander Graphics System £9.95 Super Skill Hangman £7.95 Star Jammer £7.95 Nightflight £7.95
BBC MODEL B
Dragon Rider £7.95 Tanks! £7.95 Games Comp B1 £8.95 Games Comp B3 £6.95 EDG Graphics (tape) £24.95 EDG Graphics (disc) £29.95
ORIC 1 Oric Trek £9.95 Games Comp O1 £7.95
NOW AVAILABLE AT MAJOR BRANCHES OF
Boots
AND
spectrum
Mail Order (add 50p p&p) and Catalogues (send SAE) from Dept C SALAMANDER SOFTWARE 27 Ditching Rise Brighton East Sussex BN1 4QL Tel 0273 771942
Salamander Software



12-18 May 1983 Vol 2 No 19



The Team

Editor
Brandon Gore

News Editor
David Kelly [01 930 3271]

Software Editor
Graham Taylor [01-839 2504]

Production Editor
Lynne Constable

Editorial Secretary
Caroline Owen

Advertisement Manager
David Lake [01-839 2846]

Advertisement Executive
Alastair Macintosh [01 930 3260]

Classified Executive
Diane Davis [01 839 2476]

Administration
Theresa Lacy [01 930 3266]

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly
Hobhouse Court 19 Whitcomb Street
London WC2 7HF
Telephone 01-839 6835
Published by Sunshine Publications Ltd
Typesetting, origination and printing by Chesham Press Chesham Bucks
Distributed by S M Distribution
London SW9 01 274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home

UK Addresses	
26 issues	£9 98
52 issues	£19 95
Overseas Addresses	
26 issues	£18 70
52 issues	£37 95

How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should whenever possible be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy If you want to have your program returned you must include a stamped addressed envelope

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week

Editorial

Top 10 charts are becoming increasingly popular among software users. Just as pop fans follow the Top 10 record charts religiously each week so micro enthusiasts are turning to the software charts

However as the number of charts proliferates, so does the concern over the way in which they are compiled Software manufacturers are worried that the charts often bear little relationship to the actual number of games being sold

What is needed is an independent chart which accurately reflects the state of the market But, such a chart could not be compiled by any one magazine, software company or retail chain

Ideally, the Computer Trade Association should approach a body such as the British Market Research Bureau and ask it to compile a Top 10 chart

This chart could then be supplied to all software companies and magazines — it would provide a standard Top 10 for the industry

It is in the interests of both the software manufacturer and the micro user to know which program really is the number one selling game in Britain

At the moment you can do little better than take an educated guess

Next Thursday

Shoot down all the aliens that fly in formation before they get you and then move to the star base where the mother ship is waiting! Star Swarm — a new game for the 16K Spectrum by Richard Sharod.

Micro debut

Continued from page 1

fall in the £125-£300 bracket — more than the Spectrum less than the BBC A Production is scheduled to start this month so that the micro will be available after the fair

The quality of the keyboard and the CP/M compatibility point the micro towards the business market but Memotech is equally keen to capture games users With this in mind the machine's Basic has been extended to include Logo commands adding to the range of shapes that can be defined and giving easier movements The games video section is "very powerful" according to Branton with "a good clean picture and excellent facilities for animation"

The Basic has also been extended so that up to eight virtual screens can be defined, each with independent editing

The machine has additional built-in features allowing users to learn more about programming A front panel display lets users write assembly level programs and then see what is happening inside the computer

Branton explained that this gives users "complete control of the machine at a high level while everything is displayed"

The micro has a full qwerty keyboard plus a numeric keypad and eight function keys These work in shift, giving users 16 functions which can be programmed in a similar way to the BBC micros

Branton said the keyboard has a professional feel superior to the Dragon's and it is costing Memotech "a fortune"! There is 32K of Ram 16K of video Ram and 16K of Rom Memory can be expanded up to 512K in 32K blocks There are 16 colours and 256 by 192 high resolution graphics

Other features of the micro are two joystick ports and a Centronics interface An add-on board provides an RS232 interface

Virgin games

Continued from page 1

the Commodore 64 and possibly the Texas Instruments micros

● Laurence Kaye has joined Virgin Games as sales manager — he was previously part of the Virgin record sales force

Casio's pocket-size built-in printer

CASIO is now selling a pocket computer with a built-in printer at just under £100

The new machine the FX802P, costs £99 95 and is about the same size as a man's wallet It has a standard cassette interface, but no facilities for linking separate printers or televisions Basic is the programming language and the capacity is 1,568 keystrokes

Twenty characters a line are displayed on the printer and 12 on the liquid crystal display, although this scrolls to a maximum of 60 characters The keyboard is laid out in the conventional qwerty style, but has been improved over previous models in the same family rows have been staggered and the space bar extended

Salamander converts Dragon!

SALAMANDER Software has now converted its range of Dragon 32 software to run on the 32K Tandy Color Computer with Extended Basic

The conversions have been carried out for sale in America where the Tandy Color Computer has a considerable following but the titles are now also available in the UK

The Tandy titles are priced the same as the Dragon versions Enquiries to Salamander Software, 27 Ditchling Rise Brighton

Now it's computer graphics and pop music!

POP music accompanied by computer graphics is the latest idea from Manchester singer songwriter Chris Sievey the man who brought you *I'm in love with the girl on the Manchester Virgin Megastore check-out desk*

The "B" side of his new single *Camouflage* contains a program for the 16K ZX81 The idea is that you load this and then run it while playing the "A" side of the record — giving you lyrics and computer graphics on the tv screen in synchronisation with the music

Chris admits that the graphics are "not exactly Tron" But then as he says, "in a quid what do you expect?" And anyway, there's more on the "B" side — a 16K arcade style game called *Flying Train* and a shortened 1K version for users without Ram expansion

The single called *Camouflage*, is released by Random Records and will be available from record shops from May 20 (order number RND*1)

Chris is now busy writing more songs and programs to run on the ZX81 and Spectrum, "with a possibility of Dragon, BBC Oric, etc, recordings to follow

American launch

VIRGIN Books are to launch their range of computer books in America The move follows an agreement with American publishers Dell

To check the listings before printing, Virgin Books are looking for people experienced on all the popular micros, including BBC and Oric

If you're prepared to spend a few hours typing in programs either write to Norman Dinesen at 61-63 Portobello Road London W11 or ring him on 01-221 7535

Hitch-hikers dispute is over

THE dispute over the Hitch-hikers Guide to the Galaxy adventure game has been settled

Supersoft the Middlesex-based software company and Hitch-hikers author Douglas Adams reached an agreement through their solicitors moments before the case came to court

An injunction was sought by Douglas Adams on the grounds that Supersoft had no right to use the names and places from the book in the game

In return for Supersoft dropping the game Douglas Adams has agreed not to pursue any claims over royalties on those cassettes already issued

The game was originally released by Supersoft in the belief that a letter from Pan had given them the necessary rights (*PCW* 21-27 April) Pan have paid the legal costs of both sides

Sound module for Dragon

A THREE channel sound module has been developed for the Dragon

The JCB Microsystems Sound Extension Module uses a sound chip the AY-3-8910, to extend the on board sound facilities of the Dragon

The manufacturers claim the module is easier to use than similar modules for other machines A 4K Eprom within the module sets up the registers, and a new basic command "MUSIC" is provided for use within programs

Misquoted!

We refer to an article written by David Kelly in your magazine, 24-30 March 1983 entitled *The House of the Rising Psion*

In this article the magazine has stated that "Psion has recently concluded a licencing agreement with Spears to produce a home computer version of *Scrabble*" We must inform you that there has been either a misunderstanding or a misquote with regard to this statement

J W Spear & Sons PLC has in fact concluded an exclusive licencing agreement with Little Genius Ltd to produce home computer versions of the game *Scrabble* Little Genius Ltd in turn has concluded an agreement with Psion Ltd on an exclusive basis to produce and market *Computer Scrabble* for the Sinclair ZX Spectrum personal computer

J G Baldachin
Little Genius
22 Inverness Street
London NW1 7HJ

A little mishap

I am writing to you, not to complain, but to inform you of a little mishap I had this evening

Dawlish College is a boarding school for boys and we have a Sinclair Spectrum I find putting in long programs a challenge but I have such little time that I have to do it in dribs and drabs

I started to put in the very interesting *Defender* program (*PCW* 14-20 April) which took me three days Now when I'd finished it I was really pleased with myself So I ran the program and had a game It was very good and interesting, especially the fast-moving graphics which you do not get in many games

So I had a go lost all my ships, then put my name in the hall of fame Then the computer printed up "*Would you like another go Y/N?*" I said no so I could Save it on the tape To my surprise it then said *This program will now self-destruct*

I thought it would just flash and flicker different colours which it did not — it *Newed* itself! I looked through the whole of the program and could not see a *New* so I expect it was in one of the *Pokes* which I know changes the working of the machine

I thought I would write this letter just in case something like this happens to another one of your readers

N Collins
Dawlish College
Mamhead Park
Kenton
Nr Exeter
S Devon

Our apologies to N Collins and to anyone else who suffered the same fate We should have pointed out the effect of pressing *N* in the accompanying notes However, this does highlight a very important point — always *Save* a game on tape immediately after you have entered it That way, if anything does go wrong, you still have a back-up copy

Going to the dogs?

In issue No 16 P G Clark objected to a CND ad because it is "political!"

Quite right, too! If we right-thinking people can't open a magazine without being exposed to (political) views different from our own, this country is really going to the dogs

Still at least P G Clark had his views published free — the CND had to pay so you see PG *Popular Computing Weekly* is not without a sense of proportion

On the other hand if the editor shows further signs of commie sympathies how about me and you and a few of the boys going round and sorting him out — eh! They'll be looking for the vote next

T Foxe
25 Primula Drive
Norwich

Nothing like the book

I have long been a Tolkien fan Recently I have also become a Spectrum fan Hoping to get the best of both worlds, I bought a copy of *The Hobbit* (an expensive item!)

I was influenced by your reviews among others, which suggested that the program bore a close resemblance to the book However, it seems that this is not so Neither Gandalf nor Thorin seem to display any of the characteristics which they possess in the book As for sticking to the story where are the dwarfs?

Also how about the fascinating conversations you are *supposed* to be able to hold with the characters? Most of them seem to say no more than "hurry up" or "no"! I am beginning to wonder now whether I have wasted £15 and would have got better value from three normal-priced cassettes

Ruth Morris
219 Station Road
Sutton Coldfield
West Midlands B73 5LE

I am sorry to hear that you are disappointed with *The Hobbit* I agree that it does have certain faults, but it is still the best adventure game for the Spectrum that I have seen. Judging from the reaction to our *Hobbit* competition, most other people rate it highly as well

Minority machine

I have been reading your publication for some months now because I like its presentation of news and general format

However, I have bought a Sharp MZ80A, mainly to complement my youngest son's education since his school uses Sharp MZ80Ks and the elder lad's school uses MZ80Bs (I also own a MZ80B for business purposes) I have seen no reference whatsoever in your pages to these excellent little micros and wonder whether this is a matter of editorial policy? If so, it is plainly not the magazine for my needs

It is perhaps pertinent to add that my lad's school has had six Sharp MZ80Ks for some 18 months taking a very considerable pounding The staff tell me that they've had no breakdowns to date more than could be said for some other machines, I suggest

R H Hill
8 Parkland Road
Woodford Green
Essex IG8 9AP

There are now so many different micros on the market that it is impossible to cover all of them However, we do try and devote some space to the minority machines, as well as the more popular Spectrums, Vics, *et al.*

Political offence?

I am writing in response to the letter from P G Clark (Vol 2 No 16) who appears to be confusing classified advertisements with editorial He also appears to be unable to differentiate between propaganda and advertisements to join particular groups be they user groups, programmers for real ale or whatever

Advertisements for "the best computer money can buy" and your editorial "16-year-old whizz-kid programmers" must also be propaganda by this reckoning

Even though there is absolutely no mention of politics, P G Clark says that the offending advertisement is political (is living in peace left or right?) Or is it that only politicians (the 'experts') understand the subtler points of mass destruction and that a desire for peace is too simplistic a view to be left to mere programmers?

P Tomlinson
88 Pickhurst Rise
West Wickham
Kent

A perfect square?

I like reading *Popular Computing Weekly*, especially Boris Allan when he writes about maths techniques I am not games inclined so my first priority is the puzzle which I try to solve with the aid of my trusty ZX Spectrum

Could you please help me with a problem? Some puzzles resolve to checking to see if a number is a perfect square, but if I use the algorithm

```
If Int Sqr (N) = Sqr (N) [illegible]
```

it does not work on all perfect squares, eg 25 fails Can you supply me with a method that is trustworthy?

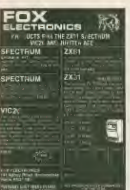
Incidentally, I get the same problem on my TRS80

H Hudson
4 Leyton Crescent
Idle
Bradford
West Yorks BD10 8RR

Unfortunately, I do not have any easy answers on tap Perhaps some of our other readers will send in some suggestions



Critical review?
The sound commands on the Oric 1 are for a computer of this price very sophisticated. Three music channels and one noise channel mean that you can program some fairly complex sounds
POPULAR COMPUTING WEEKLY
Oric is everything you hoped it would be. Alive with colour and zapping with built in sound effects the Oric looks like a match for any machine now selling for less than £200
YOUR COMPUTER
£25 cheaper it feels a good deal more professional than the home appeal Sinclair Oric's sound is extremely versatile and well up to the standard of the £300 or £400 BBC microcomputer made by Acorn
WHICH MICRO?
seemed only faster when performing the simplest of calculations has come back to beat the Spectrum by a small amount. As the problems get more complex the Oric comes into its own. One final point – in entering the benchmark tests – the Oric was certainly the
WHICH MICRO?
of the keys makes the Oric an easy machine to touch type on. All keys have auto repeat and there are four keys dedicated specifically to cursor control. It is certainly easier to type on than any of Sinclair's offerings
YOUR COMPUTER
so that Prestel will become available
will be able to accept telesoftware –
loaded straight down the phone line
electronic mail could come into the
by the same route and with the addition
tape recorder the Oric with its Modem
become a telephone answerer and
reminder in the top right hand corner to show that you've engaged all-capitals mode. So much better than the BBs variety of lights in the corner of the keyboard. The Oric is sound simple to get along with and offers great expansion potential
WHICH MICRO?
When compared to the sloggness of the Spectrum's keyboard this is certainly an improvement. I can't see any Orics falling through bad assembly. If only the £2400 IBM were so easy to use
WHICH MICRO?
Instead of the Spectrum's 28 look up single-character error reports the Oric has 18 self-explanatory messages. If you actually want to do computing rather than just exploring the world of off the shelf game programme entertainment the Oric will be a better buy
WHICH MICRO?
A good speaker and built in noises get the Oric's sound off to a good start. Typing Zap, Ping, Shoot or Explode produces convincing arcade game noises which can easily be incorporated into any program
YOUR COMPUTER
The modem is certainly unusual in a machine of this price. Together with the other peripherals when finally available it should make for an attractive package for a small business surely a match for machines costing much more
POPULAR COMPUTING WEEKLY
ORIC-1
The Real Computer System
ORIC PRODUCTS INTERNATIONAL LTD.
available from... WHSMITH ● DIXONS ● GREENS
LASKYS ● MICRO'C' ● MICRO PERIPHERALS
SPECTRUM ● COMPUTERS FOR ALL
And hundreds of independent dealers.


FOX
ELECTRONICS
SPECTRUM
ZX81
SPECTRUM

Alien Lander

A new game for the BBC by Oke Uwechue

The object of the game for the BBC micro is to land your craft on the landing pad on an alien planet, but the game is not as easy at it seems Firstly your ship accelerates downwards due to gravity and you have to keep on *Thrusting* to buoy it up (however, the craft also accelerates upwards due to *Thrusting*) Secondly every so often, a missile thunders past the screen cruising at a level close to your landing pad and it must be avoided Thirdly if your craft touches any part of the planet terrain, you will immediately lose a life

Movement sideways is by using the arrow keys (← and →) and you can *Thrust* by pressing the *Q* button Your score, hi-score, and general status are continuously displayed on the screen The game contains a full set of instructions

I have made use of some special features of the BBC machine

i) The envelope command at line 390 The sound statement accompanying this is at line 1360

ii) I used a different kind of *Inkey* statement (lines 690-710) because it allows a rapid keyboard scan

iii) I have also used the key command **FXIS 1* in order to flush the keyboard buffer of surplus characters which appear at the end of the game (This always happens when using the special *Inkey* command as I have)

iv) Nearly all the variables I used were % variables ie integer variables — this helps speed up the Basic a little

Program listing

Lines	
34-164	Introduction display
104-360	Instructions
360-410	Initialising
420-443	Character definition
450-560	Constructing the scenario
500-540	Main loop
600-580	Thrusting procedure
1010-1070	Ending the game when your ship has gone too high
1104-1104	Procedure to forfeit a life
1134	Checks if you have any lives left
1104-1250	End of game when you have used up all your lives
1300-1330	Scoring procedure (also checks if velocity is less than 7 m/sec
1000-1520	Procedure to blow up the craft when it is hit by a missile
1530	Checks to see if you have any lives left
1580	Checks if missile has hit your craft
1600-1560	Ends the game when you run out of fuel



```
10 REM****1983(c)   D.UWECHUE
20 REM
30 MODE2:C.1:C 129:CLS
40 FORM%=1TO90:A%=RND(1300)-100
50 B%=RND(120):H%=RND(80)+15
60 MOVEA%,230:MOVEA%+B%,230
70 PLOT85,A%+30,230+H%:NEXT:C.3
80 C.128:PRINTTAB(3,5),"   ALIEN
90 PRINTTAB(7,10),    LANDER
100 FORC=1TO2000:NEXT
110 CLS:MODE0
120 PRINT PRINT
130 PRINT"              YOUR TASK IS QUITE A SIMPLE ONE:
140 PRINT"STEER YOUR CRAFT TO land (NOT crash!) ONTO THE GLOWING LANDING PAD"
150 P. ON THE PLANET SURFACE WITH A DESCENT VELOCITY OF LESS THAN 7m/sec.
160 P. USE THE CORRESPONDING  ARROW' KEYS TO MANOEUVRE YOUR CRAFT(along x-axis"
170 P. only).BE SURE TO TAKE HEED OF THE FOLLOWING:-"
180 P.    1) YOUR CRAFT WILL ACCELERATE DOWN WARDS DUE TO THE PLANET'S"
190 P          GRAVITATIONAL PULL.'
200 P.'  2) TO COUNTERACT THIS,YOU MUST USE THE thrust BUTTON( Q') IN ORDER"
210 P          TO PROPEL YOUR CRAFT UPWARDS.BUT BE CAREFUL:YOUR CRAFT ALSO'
220 P."        ACCELERATES UNDER thrustING AND YOU MAY FIND YOURSELF PROPELLED"
230 P          OUT INTO ORBIT "
240 P.:P.'YOU ONLY USE UP 2 FUEL POINTS FOR ANY MOVEMENT ALONG X-AXIS"
250 P.'BUT YOU BURN UP 5 FUEL POINTS AT A TIME FOR thrustING.
260 P '      BEWARE THE PLANET'S DEFENCES: surface missiles' THAT PERIODICALLY'
270 P. SKIM THE SURFACE OF THE PLANET IN SEARCH OF ANY ALIEN LANDING
280 P CRAFT IF YOU SHOULD COLLIDE WITH ONE OF THESE,YOUR CRAFT WILL BE"
290 P 'IMMEDIATELY DESTROYED AND YOU WILL CONSEQUENTLY LOSE ONE OF YOUR"
300 P. THREE LIVES.YOU WILL ALSO LOSE A LIFE IF YOUR CRAFT CRASHES INTO"
310 P. THE MOUNTAINOUS TERRAIN.'
320 P. HOWEVER,YOU WILL BE WARNED OF THE MISSILE'S APPROACH BY THE "
330 P."PECULIAR BURST OF ULTRASOUND IT EMITS.
THIS SOUND WILL BE PICKED
340 P."UP" BY YOUR SCANNERS AND TRANSMUTED INTO AN AUDIBLE FREQUENCY."
350 P."    YOUR SHIP WILL BE REFUELLED AFTER EVERY 4 SUCCESSFUL LANDINGS!"
360 P.'             YOU SCORE 10 POINTS PER LANDING."
370 P :P."   (press any key to begin)...
380 D$=GET$
390 HI%=0:ENVELOPE 1 1,100,0,-7,15 1,50,126,-10 -5,126,126:W%=0
400 MODE1:X%=500,Y%=970:G%=0:VDU5
410 IFE%=15:FUEL%=900:SC%=0:T=0 K%=0
420 VDU23,250,170,170 68,40,16 0,0,0
430 VDU23,230,0 0 3 7,17,62 71,224
440 VDU23,235 0,16,16 240,176,124,226,7
450 A$=CHR$230+CHR$235:GCOL0, .E%=2
460 FORM%-1TO80:A%=RND(1300)-100
470 B%-RND(120):H%=RND 50)+15
480 MOVEA% 230:MOVEA%+B%,270
490 PLOT85,A%+30,230+H%:NEXT
500 MOVE0,230:MOVE1300,230
510 PLOT85,0,180:PLOT85,1300,180
520 GCOL0 2:FORV=1TO20 S1=RND(1300)
530 S2=RND(665)+290,PLOT69 S1,S2:NEXTV
540 P=RND(300)+400:GCOL0,0:MOVE P,220
550 MOVE P+75,220:PLOT85,P,295
560 PLOT85,P+75,295,GCOL0,1
570 PRINTTAB(17,27)  S T A T U S
580 GCOL0,3:Z%=0
590 PRINTTAB(14,29),"SCORE:"+STR$(SC%)
600 PRINTTAB 25,29), VELOCITY:
610 P.TAB(1,29) "FUEL :"+STR$(FUEL%)
620 GCOL0,1
630 P TAB(5,30),"LIVES "
640 GCOL0,3:P TAB(11,30)+A$+A$
650 GCOL0,1:P TAB(18,30),'HI-score: .STR$(HI
660 REM:::::.::::::::::::.:::
670 REM...:m a . o      ! o o m::::
680 REM.:::::::::::::::::::::::::::
690 IF INKEY(-17)=-1 GOTO900
700 IF INKEY(-122)=-1 THENX%=X%+15:FUEL%=
-2:GOTO720
710 IF INKEY(-26)=-1 THENX%=X%-15:FUEL%=FUEL%-
730 T=T+1
740 Y%=Y%-T:MOVEX%,Y%
750 GCOL0,0:PRINT A$
750 VDU4:P TAB(34,29)+STR$(T+1 1)
760 IF POINT(X%,Y%-30)=1 THEN1110
770 IF POINT(X%+60,Y%-30)=1 THEN1110
```

Continued on page 1?

Continued from page 11

```
780 IF Y%<240 GOTO1110
790 IF Y%-29<232 AND Y%-29>220 THEN1290
800 IF Y%>990 THEN1010
810 IF K%=1 THEN1390
820 IF K%=0 AND RND(30)=1 THEN1300
830 VDU5:MOVEX%,Y%:GCOL0,0:PRINTA$
840 GOTO650
850 REM::::::::::.::::::::::...:
860 REM:..::e n d    l o o p::.:
870 REM
880 REM::::PROC  thrust:::::'':'
890 REM:::::::::::::::::::::::::
900 GCOL0,3
910 MOVE X%+10,Y%-30:VDU250
920 MOVE P,230:DRAW P+75,230
930 FUEL%=FUEL%-5:VDU4
940 IF FUEL%<2 THEN1600
950 P.TAB(7,29)+STR$(FUEL%):VDU5
960 T=T-3:SOUND1,-10,5,1:GCOL0,0
970 MOVE X%+10,Y%-30:VDU250
980 Y%=Y%-T:GOTO730
990 REM::::END  thrust:::::::::
1000 REM::::::.::::::::::::::....
1010 SOUND2,-10,100,6:SOUND3,-10,60,6
1020 *FX15,1
1030 VDU4:P.TAB(10,7),"* E N D *"
1040 P.:P."You have been propelled out intr
orbit."
1050 PRINT:INPUT"ANOTHER GAME",Q$
1060 IF Q$="Y" OR Q$="YES" GOTO1350
1070 MODE7:PRINT:PRINT:END
1080 REM::.:::::::...:.:::::.::
1090 REM::::MINUS LIFE.::': :.::
1100 REM::::::::::..::..::. ::
1110 SOUND0,-15,5,5
1120 LIFE%=LIFE%-2
1130 IF LIFE%<1 THEN1190
1140 VDU4:P.TAB(LIFE%,30),
1150 VDU5:GCOL0,0:MOVEX%,Y%:PRINTA$
1160 X%=RND(300)+400:Y%=950:GOTO650
1170 REM:::'.::.:::::::,.: :::'
1180 REM
1190 SOUND2,-10,100,6:SOUND3,-10,60,6
1200 *FX15,1
1210 VDU4:P.TAB(10,7),"* E N D *"
1220 PRINTTAB(3,8),"You have used up all your
lives"
1230 PRINT:INPUT"ANOTHER GAME",Q$
1240 IF Q$="Y" OR Q$="YES" THEN1350
1250 MODE7:PRINT:PRINT:END
1260 REM::::::::::::::::'::::::::
1270 REM::::::::PROC score:::::::
1280 REM::.::::::::::::::::'::::
1290 IF T>7 THEN590 ELSESC%=SC%+10:VDU4:P.TAB
(20,29)+STR$(SC%):G%=G%+1:IF G%=4 THEN FUEL%=
800:G%=0:T=0
1300 SOUND2,-12,190,2
1310 VDU5:GCOL0,0:MOVE X%,Y%:PRINTA$
1320 X%=RND(300)+400:Y%=950
1330 GOTO690
1340 REM.....:...' '.':..'.:':
1350 IF HI%<SC% THEN HI%=SC%
1360 GOTO400
1370 REM' :.'::::::.:::'::::'::
1380 K%=1:Z%=1400:SOUND&11,1,50,4
1390 GCOL0,2
1400 MOVE Z%,295:DRAW Z%+10,295
1410 IF Z%<X%+70 THEN1580
1420 GCOL0,0:DRAW Z%+77,295
1430 Z%=Z%-70:IF Z%<200 THEN 1570
1440 GOTO870
1450 REM: :.  : r.' : ::.:::''
1460 K%=0:GCOL0,0:SOUND0,-15,4,7
1470 MOVE X%+15,Y%-15:DRAWX%+40,Y%+25:MOVE X%
+15,Y%-15:DRAW X%+45,Y%+10:MOVE X%+15,Y%-15:
DRAW X%+50,Y%+10:MOVE X%+15,Y%-15
1480 DRAW X%+45,Y%-15:MOVE X%+15,Y%-15:DRAW X%
+26,Y%-45
1490 GCOL0,0:MOVE X%-10,Y%-15
1500 MOVEX%+60,Y%+60:PLOT85,X%+50,Y%-67
1510 VDU5,MOVE X%,Y%:PRINTA$
1520 LIFE%=LIFE%-2
1530 IF LIFE%<1 VDU5:GOTO1190
1540 VDU4:P.TAB(LIFE%,30)," ",VDU5
1550 X%=RND(400)+300:Y%=970:GOTO690
1560 GOTO830
1570 K%=0:DRAW Z%,295:GOTO830
1580 IF Z%>X%-3 AND Y%>295 AND Y%<325 THEN 1460
1590 GOTO1420
1600 PRINTTAB(10,7),"~~EMPTY FUEL TANKS~~"
1610 PRINTTAB(7,29)+STR$(0)
1620 *FX15,1
1630 P.TAB(2,9),"You are out of fuel!your craft
has crashed."
1640 PRINT:INPUT"ANOTHER GAME",Q$
1650 IF Q$="Y" OR Q$="YES" THEN1350
1660 MODE7:PRINT:PRINT:END
```

Absolute power . . .

***Graham Taylor** battles with his conscience in a bid to become The Great Dictator – and loses!*

Despite the fact that Z80 programmers are a dime a dozen these days (well about 20 percent royalties a dozen actually) software houses often still rely on versions of arcade favourites to win sales.

Those wishing to buy a copy of the most popular arcade game (ie *Space Invaders*) have a choice of about five different versions with only minor differences between them. The reason for this is not hard to find — it is far more difficult to think up original games ideas than it is to find programmers who can turn existing ideas into code. The upshot of all this is that companies are now turning to the second division arcade leaders like *Frogger* and *Centipede*.

In the past months there have been at least three versions of *Centipede* issued. Your choice will depend very much on what you value most — speed, graphics or authenticity.

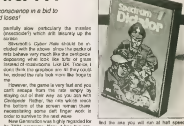
The first game, from DK Tronics, loaded a pleasing title page complete with centipede, but was lacking in some of the more exotic garden creatures featured in the original. Although disappointing in this respect I nevertheless enjoyed the game. Fast keyboard response and sound affects made it in the "Oh no it's three o'clock in the morning and I have to get up tomorrow" class.

In contrast CDS Systems' *Catterpillar* features a poisonous snail that wanders across the screen from time to time and a very realistic spider that gleefully bounces towards you. Unfortunately the game is painfully slow, particularly the missiles (insecticide?) which drift leisurely up the screen.

Silversoft's *Cyber Rats* should be included with the above since the packs of rats behave very much like the centipede depositing what look like tufts of grass instead of mushrooms. Like DK Tronics, I don't think the graphics are all they could be, indeed the rats look more like frogs to me.

However, the game is very fast and you can't escape from the rats simply by staying out of their way as you can with *Centipede*. Rather, the rats which reach the bottom of the screen remain there necessitating some deft finger work in order to survive to the next wave.

New Generation was highly regarded for its ZX81 programs. Now it has two programs available for the Spectrum.



More fun watching the computer play itself!

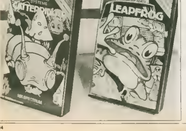
The first issued almost as soon as the machine was available is *Escape*. In a sort of *Theseus and the Minotaur* scenario, you are trapped in a maze pursued by various kinds of prehistoric monster. Most of these are somewhat slower than you, but at the hardest level a vicious pterodactyl swoops over the maze after you.

The only aim is to escape and to do this you need to find an axe which is hidden somewhere within the maze. But if you do find the axe you will run at half speed making a quick death all the more likely.

The highest recommendation I can give this game is that I bought it last November and have never stopped playing it. Indeed, I have only ever escaped from the monsters once at level five.

The follow up — *Tunnel* — is less easily recommended. This game features the best animated graphics I have seen on the Spectrum (and that includes *Horace*) with highly detailed frogs and rats that run and jump towards you. If you just want to impress your Atari-owning friends, this is the one to do it. However, as a game it does not work.

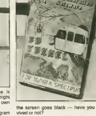
To pass from one stage to the next, you must kill vast numbers of each animal, armed only with a strangely pathetic laser. This takes ages and soon gets tedious — you will have more fun watching the computer play itself in the demo version. Obviously, a vast amount of work has gone into this program and it seems a pity it has been rather thrown away at the last minute.



Talking of frogs, CDS Systems has issued a version of *Frogger* which features all the tunes of the original. It is a good game, simply because it is a fast machine code version of an excellent original concept. However, the graphics, particularly for the river and frogs, are not as good as they might have been. And the tune at the beginning gets irritating after you have heard it a few times. In short, enjoyable but not particularly inspiring.

Derby Day by Computer Rentals was something of a dark horse (sorry). The idea of a horse racing game written in Basic was not inspiring, but when I actually ran it I was pleasantly surprised. There are a number of options, including the chance to name your own horses and odds. Bets are placed with honest Clive — a bookmaker of doubtful integrity.







The animation of the actual race is astonishing for a Basic program and might inspire you to greater things in your own programming

Breakout is a popular computer program that is so often included in books and magazines (and indeed on the Horizons demonstration tape) that it takes courage to try and sell one commercially *Superball* from Axis attempts just that — is it worth buying? I think if you are a *Breakout* fan the answer is yes Good sound various options and machine code speed make it highly addictive and infuriating There is a significant enough difference between this and what you might get for free elsewhere to justify paying for it.

Your only allies are the Secret Police!

Dictator from DK 'Tronics is one of the most original games I have seen It is a form of those 'run the country games where you have to balance various interests that conflict — but at such an ingenious and witty level it hardly betrays its origins

You are the Dictator of "somewhere vaguely equatorial and have two basic objectives — first to survive revolutions and assassination attempts secondly to steal as much money as possible from your own treasury for your Swiss bank account

Your only real allies are the Secret Police, who can give you police reports on the state of the various factions within the country You can appease these factions by policy decisions — the problem is that these will either cost money or upset some other faction

Failing to maintain this balance will result in plots against you and eventually a revolution which you may or may not survive It is almost worth deliberately upsetting some group so that this situation occurs The screen flashes red and battle begins with your weedy Spectrum sound device suddenly making impressive machine gun and bomb noises Suddenly the screen goes black — have you survived or not?

It was instructive to discover how quickly you lose what liberal conscience you may have begun with in the pursuit of money and power For example I quickly lowered the minimum wage of the peasants to please the landowners

An excellent game not exhausted by even dozens of plays

Finally an adventure game — or rather two adventure games Micro-Gen s *Mines of Saturn* and *Return to Earth* are basic text adventures with all the usual features For those new to adventuring two games for the price of one is good value And being able to break into the Basic usually a disadvantage is helpful in gaining experience of how to solve the problems — useful for novices

A mixed bag of software then, none of it actually bad value for money but the quality both of programming and original thought differing widely Being positive though, I would rate two of the games here *Escape* and *Dictator* as being amongst the best Spectrum games I have played ■

Firm	Program	Cost	Value (1-10)
DK Tronics 23 Sussex Road Gorleston Great Yarmouth Norfolk	*Dictator* *Centipede*	£5 95 £4 95	9 7
CDS Micro Systems 10 Westfield Close Tickhill Doncaster	*Leapfrog* *Caterpillar*	£4 95 £4 95	7 6
New Generation 16 Brendon Close Oldland Common Bristol BS15 6QE	*Escape* *Tunnel*	£4 95 £5 95	8 6
Silversoft London House 271 273 King Street London W6	*Cyber Rats*	£5 95	7
Axis (UK) 71 Brookfield Avenue Loughborough, Leics LE11 7LN	*Superball*	£5 95	8
Computer Rentals 140 Whitechapel Road London E1	*Derby Day*	£5 95	8
Micro-Gen 24 Agar Crescent Bracknell Berkshire	*Mines of Saturn* *Return to Earth*	£5 95	

The mystery solved

Ian Logan explains some of the mysteries contained in the Draw command

There have been several requests in *Popular Computing Weekly* for an explanation to the phenomenon of the very attractive patterns produced by using the *Draw* command with high angles of turn (for the best introduction to this see Nick Wilson's article, January 20-26 1983)

Patterns are produced as follows, eg

PLOT 50 50 DRAW 50 50 9999

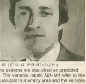
which produces the pattern labelled Figure 1. So, just what is going wrong to give a pattern rather than a 'curved line'?

Well the answer lies in the programmer failing to take the 'angle of turn' *Mod 2*Pi* — that is, using the remainder after dividing by *2*Pi*. And, indeed a curve is produced by

PLOT 50 50 DRAW 50 50 9999-2*PI*INT (9999/(2*PI))

For the best patterns the number of arcs is 252 (the limiting value in the Rom program), as the pattern is built up by drawing a series of arcs. In the example — *Draw 50 50 9999* — the first arc is much too long and the succeeding 251 arcs continue with the hunt for the destination with an equal lack of success.

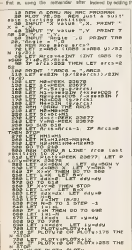
In order to show just how these patterns are produced I have written the *Draw an arc program*. This is a Basic program that closely follows the algorithm used in the *Draw* routine of the Spectrum Rom. By having it in Basic, the user is able to see a pattern developing slowly and can use the *Break* key to modify the program easily. Indeed by adding the line



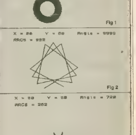
65 LET G=G-2*PI*INT (G/(2*PI))

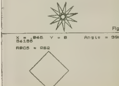
the patterns are abolished as predicted.

The variable labels *M0–M4* refer to the 'calculator's memory area and the variable label *Sc* to the machine stack. Figures 2-4 show a range of patterns produced by this program. ■



```
 10 REM A DRAW AN ARC PROGRAM
 20 PLOT 70,35: REM just a suit'
able starting position
 30 INPUT "X value ",X: PRINT "
X = ";X;
 40 INPUT "Y value ",Y: PRINT T
AB 10;"Y = ";Y;
 50 INPUT "Angle ",G: PRINT TAB
 20;"Angle = ";G
 60 REM How many arcs?
 70 LET z=ABS ((ABS x+ABS y)/SI
N (g/2))
 80 LET Arcs=4*INT (INT (ABS (g
*SQR Z)+0.5)/8)+4
 90 IF arcs>252 THEN LET arcs=2
52
100 PRINT '"ARCS = ";ARCS
110 LET w=SIN (g/(2*arcs))/SIN
(g/2)
120 LET M0=PEEK 23678
130 LET sc=PEEK 23677
140 LET F=.5*(g-g/arcs)
150 LET M1=y*w*SIN f+x*w*COS f
160 LET M2=y*w*COS f-x*w*SIN f
170 LET M3=COS (g/arcs)
180 LET M4=SIN (g/arcs)
200 REM 'DRAW THE ARCS'
210 LET M0=M0+M2
220 LET Sc=Sc+M1
230 LET X=sc-PEEK 23677
240 LET Y=M0-PEEK 23678
250 GO SUB 510
260 LET Arcs=Arcs-1: IF Arcs=0
THEN STOP
270 LET MM1=M1
280 LET M1=M1*M3-M2*M4
290 LET M2=MM1*M4+M2*M3
300 GO TO 210
500 REM 'DRAW A LINE' from last
position to X,Y
510 LET Plotx=PEEK 23677: LET P
LOTy=PEEK 23678
520 LET dX=SGN X: LET dy=SGN Y
530 LET X=ABS X: LET Y=ABS Y
540 IF X>=Y THEN GO TO 560
550 LET L=X: LET B=Y
560 LET ddX=0: LET ddy=dy
570 GO TO 610
580 IF X+Y=0 THEN STOP
590 LET L=Y: LET B=X
600 LET ddX=dx: LET ddy=0
610 LET H=B
620 LET i=INT (B/2)
630 FOR N=B TO 1 STEP -1
640 LET i=i+L
650 IF i<H THEN GO TO 690
660 LET i=i-H
670 LET iX=dx: LET iy=dy
680 GO TO 700
690 LET iX=ddx: LET iy=ddy
700 LET PLOTy=PLOTy+iy
710 IF PLOTy<0 OR PLOTy>175 THE
N STOP
720 LET PLOTx=PLOTx+ix
730 IF PLOTx<0 OR PLOTx>255 THE
N STOP
740 PLOT PLOTx,PLOTy
750 NEXT N
760 RETURN
```





Graphic exercises . . .

Simon Cross presents an animated graphics program for the 3K Jupiter Ace

This is a program for the 3K Jupiter Ace. It demonstrates how smooth animated graphics can be produced by redefining characters whilst the program is running. The program prints a squad of 112 men on the screen who then go through a series of arm exercises. Unfortunately, the limitations of the 3K memory do not permit leg movements or the use of sound.

Type in the word definitions in the usual way and *Save* the program on tape. The program is Run by typing *Drill* and then pressing *Enter*. You can put the men through your own routine by typing *Invis drill* and pressing *Enter* followed by *Break*. Letters *a* to *j* can then be entered to produce single movements of the men (unfortunately, *Error 3* still remains printed at the bottom of the screen).

Program notes

Each man consists of four user-defined characters as follows:

ASCII CODE	CHARACTER
1	left top half
2	left bottom half
3	right top half
4	right bottom half

The squad of men is printed on the screen by the *Do-loop* before *Begin* in the word *Drill*. Their movements are produced by redefining the characters of which they are composed. This gives a smooth and simultaneous movement of all the men which could not be achieved by printing different characters ' on top ' of the original characters. The words *a* to *j* merely put the numbers necessary to redefine the character on to the stack and these numbers are then read into the character set memory by a *Do-Loop*. ■

```
: Z
DO
 I C!
LOOP
;

: A
006 002 002 002
002 003 011 011
011 015 001 001
003 003 007 003
11200 11272 Z
;

: B
096 064 064 064
064 192 200 200
200 240 120 120
192 192 224 192
11304 11200 Z
;

: C
006 002 002 002
002 003 003 003
003 127 001 001
003 003 007 003
11200 11272 Z
;

: D
096 064 064 064
064 192 192 192
192 254 120 120
192 192 224 192
11304 11200 Z
;

: E
027 039 065 001
003 003 007 003
11200 11272 Z
;

: F
216 220 130 120
192 192 224 192
11296 11200 Z
;

: G
003 007 009 017
035 067 007 003
11200 11272 Z
;

: H
192 224 144 136
196 194 224 192
11296 11200 Z
;

: I
003 007 009 017
019 011 007 003
11200 11272 Z
;

: J
192 224 144 136
200 208 224 192
11296 11200 Z
;

: *
1500 0
DO
LOOP
;

: DRILL
CLS 7 0
DO
 16 0
 DO
  ." (Graphics A,C)"
 LOOP
 16 0
 DO
  ." (Graphics B,D)"
 LOOP
 CR
LOOP
BEGIN
 A B * C *
 D * E * F
 * G * H *
 I * J * H
 * G * F *
 E * D * C
 * B * A *
 0
UNTIL
;
```

Drawing the line . . .

***Calvin Woodings** explains the ins and outs of linear regression and correlation*

One of the most common forms of experiment involves measuring the response of a variable (Y) to changes, either deliberate or random, in a second variable (X). When the experiment is complete the results are plotted on graph paper to see how the relationship between X and Y looks. Sometimes a straight line can be drawn through the plotted points, and this line can be used to deduce values of Y from new and unmeasured values of X and vice-versa.

Such lines are represented by the equation $Y=mX+c$ where 'm' is a parameter expressing the slope of the line and 'c' is the value of Y where the line crosses the Y axis. All is simple and straightforward, so long as the plotted points form a reasonably straight run through which the line can be drawn without too much uncertainty. Unfortunately, in real-life situations there are all too many occasions where the plotted points appear more like frogspawn than a straight line and, as a consequence, there are real problems in deciding where to draw the line.

This program helps you to deal with all eventualities. Whether the data is good or bad it plots the points, and uses the least squares method to draw the best lines relating X and Y. Two lines arise because, in cases where the correlation between X and Y is less than perfect, the best estimate of Y from X requires a different line from that giving the best estimate of X from Y. These two lines are called the regression lines and a full explanation of their derivation will be found in statistics textbooks.

Having drawn the two regression lines the computer then prints out the two equations for these lines and the correlation coefficient for the data as a whole. You can estimate intermediate values of the variables either from the lines by inspection or from the equations by substitution. If you feel that the latter approach is more suited to your needs, you could easily add an additional procedure to request values of X or Y and print out the corresponding estimate of Y or X using the appropriate equation.

The illustration shows how the program presents its results. Actual points are given by the '+' signs. The best line for estimating Y from X is the bold line — the dotted line (or the fainter line if you don't have a monitor) being the best line for estimating X from Y. They intersect at a point which gives the mean values of the data.

The equations of the two regression lines contain the computed values for slope and intercept. These, along with the correlation coefficient, are printed out in whichever top corner is free of plotted points.

Looking further at the example graph you can see that the scatter of results is quite large and that without the use of the least squares technique within the program the best lines would be difficult to draw. The negative correlation coefficient indicates that Y (ie, the exam mark) decreases as X (ie, hours viewed) increases. The value of 0.738 suggests a reasonable correlation, a value of 1.00 would have been perfect correlation, and a value of zero would have indicated no relationship.

If you wanted to know the most likely mark for a child who watched 300 hours tv in the final term, the answer would be $-0.102*300+88.2$ or 57.6 percent. The same deduction could have been made visually (and approximately) by reading off the Y axis value corresponding to where the vertical from 300 on the X axis cuts the bold ("Y on X" regression) line.

The other equation corresponds to the dotted regression line ("X on Y") and would be used if you knew the exam marks and wanted to deduce the hours of tv viewed.

The program only works for data which obeys the straight law ($Y=mX+c$). It will draw a line through points which are obviously better fitted by a curve, and under these circumstances the equations printed are meaningless. All is not lost, however. The data input routine will accept expressions, so you could re-enter the data using a function (logarithm for instance) of X to see if this improves linearity.

Before describing the program, and before irate students or teachers reach for their Letters-to-the-Editor pen, I should explain that the data used in the example graph is entirely fictitious, however plausible it may seem to some parents!

Program notes

The need to enter and edit pairs of data points means that some of the utility procedures are different from those used in the previous two programs (see *PCW* issues 16 and 17). However, functions *input* and *'yes no'* along with procedures *'double height'* and *'continue'*, are the same as before, despite a slightly space saving change in appearance. These could be entered from tape if you have already typed one of the earlier programs.

The main routine at lines 50 to 160 is simply a series of questions, the responses to which determine the procedures to be called.

Procanalysis is used every time data has been entered or altered, and it works out the correlation coefficient (r) and the regression equations constants (m and c for "Y on X"; $m1$ and $c1$ for "X on Y"). Along the way, it works out the means and standard deviations of the data to substitute in the equations given in lines 1070 to 1090. It also establishes the highest and lowest values of the data for scaling purposes (lines 940-1000).

Procplot draws the border (line 1140), the axes (line 1160), the points (lines 1170-1190), the bold regression line (lines 1200-1210) and the dotted regression line (lines 1220-1230), all using the false origin created by *Vdu29* at line 1150. It then calls *Proclabel* which labels the axes (lines 1270 to 1360), prints the equations (lines 1370-1400) and labels the graph (line 1410). The operation of the other procedures is fairly clear thanks to the BBC's ability to use long variable names in a well-structured layout.

Numerous extensions to the program are possible and for my own use (no space restraints) I print out a second results page with the means, standard deviations, high and low values and the interpolation requests. I also call a machine code screen dump before finishing so that an attractive hard copy of the graph can be obtained quickly. ■

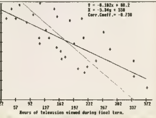
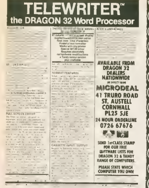


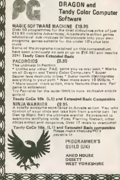
FIG 1. CORRELATION BETWEEN EXAMINATION RESULTS AND TELEVISION VIEWING HABITS

```
10   REM STATISTICS/LINEAR REGRESSION AND
     CORRELATION
20   REM (C) C.R.WOODINGS/APRIL 1983
30   REM FOR BBC MICRO MODEL B
50 DIMxdata(99),ydata(99):K=0:title$=""
60 MODE7:PROCtitle
70 REPEAT
80 MODE7:IF FNyes no(5,10,"Start with fresh
   data ") OR K=0 MODE1:PROCdataload
90 MODE7:IF FNyes no(10,10,"See and edit ")
   MODE1: PROCreview
100 PROCanalysis
110 MODE7:IF FNyes no(7,10,"New graph titles")
   OR title$="" PROCgraph
120 CLS:IF FNyes no(5,10,"Select the graph
   origin ") PROCorigin
130 MODE1:PROCplot:REPEAT UNTIL GET
140 UNTIL NOT FNyes no(12,VPOS+1,"Another run ")
150 MODE7:PROCdouble height(8,"BYE",132)
160 END
180 DEFPROCtitle
190   PROCdouble height(8,"STATISTICS",132)
200   PROCdouble height(12,"Linear Regression
      and Correlation",131)
210   PROCcontinue:ENDPROC
230 DEFPROCdouble height(row,words$,colour)
240   column=INT((40-LEN(words$))/2)-2
250   FOR I=row TO row+1:PRINTTAB(column,I);
      CHR$141;CHR$colour;words$
260   NEXT:ENDPROC
280 DEFFNyes no(x,y,A$)
290   LOCAL ans:PRINT:PRINTTAB(x,y);A$;"
      (Y/N) ";
300   REPEAT:ans=(GET AND &DF):UNTIL ans=&59
      OR ans=&4E:PRINTCHR$ans
310   =(CHR$ans="Y")
330 DEFPROCcontinue
340   PRINTTAB(7,23)"Press any key to continue
      ";:REPEAT UNTIL GET:ENDPROC
360 DEFPROCdataload
370   CLS:COLOUR 2:PRINTTAB(14,2)"DATA LOADING:"
380   PRINTTAB(2,4)"Expressions are accepted:
      End with 00"
390   COLOUR 3:VDU28,0,31,39,6:k=1
400   PRINTTAB(3)"Max. no of pairs ";
410   array=VALFNinput(2,39,58):PRINT
420   REPEAT
430   PRINTTAB(2);k;TAB(5,VPOS)"X=";
440   data$=FNinput(10,39,58):xdata(k)=
      EVAL data$
450   IF LEFT$(data$,2)="00" THEN 480
460   PRINTTAB(25,VPOS);"Y=";:data$=FNinput
      (10,39,58):ydata(k)=EVAL data$
470   k=k+1:PRINT
480   UNTIL LEFT$(data$,2)="00" OR K>array:
      k=k-1:ENDPROC
500 DEFFNinput(len,loASC,hiASC)
510   LOCAL K%,Z%:K%=0:in$="":PRINT "?";
      :REPEAT:Z%=GET
520   IF Z%=127 AND K%>0 THEN K%=K%-1:in$=LEFT
      $(in$,K%):VDUZ%
530   IF Z%>loASC AND K%<len AND Z%<hiASC THEN
      K%=K%+1:in$=in$+CHR$Z%:VDUZ%
540   UNTIL Z%=13 AND K%>0
550   =in$
570 DEFPROCreview
580   VDU26:CLS:COLOUR 2:PRINTTAB(14,2)
      "DATA EDITING:"
590   COLOUR 3:VDU28,0,31,39,6:L=0:M=0
600   REPEAT:CLS:FOR N=1 TO 10
610   IF N+L>k+1 THEN 640
620   PRINTTAB(2);N+L;TAB(5,VPOS)"X=";xdata
      (N+L);TAB(25,VPOS)"Y=";ydata(N+L)
630   NEXT
640   PRINTTAB(10,15)SPC150
650   IF FNyes no(8,15,"Change an entry ")
      PROCchange:GOTO640
660   L=L+10:UNTIL N+L-11=k
670   IF M>k THEN k=M
680   PRINTTAB(10,15)SPC150
690   IF FNyes no(8,15,"Another look ")
      PROCreview
695   ENDPROC
710 DEFPROCchange
720   PRINTTAB(2,17)"Which pair ";:M=VAL
      FNinput(3,47,58)
730   PRINTTAB(2,18)"New X=";:xdata(M)=EVAL
      FNinput(10,39,58)
740   PRINTTAB(20,18)"New Y=";:ydata(M)=EVAL
      FNinput(10,39,58):ENDPROC
760 DEFPROCgraph
770   PROCdisplay(0,10,130,"Enter the graph
      title.(Up to 79 chars.)")
780   title$=FNinput(79,31,127)
790   PROCdisplay(2,10,132,"Enter X-axis label
      (Up to 40 chars.)")
800   xlabel$=FNinput(40,31,127)
810   PROCdisplay(2,10,132,"Enter Y-axis label
      .(Up to 20 chars.)")
820   ylabel$=FNinput(20,31,127):ENDPROC
840 DEFPROCdisplay(x,y,colour,A$)
850   CLS:PRINTTAB(x,y)CHR$colour;A$:
      PRINT:ENDPROC
870 DEFPROCorigin
880   PROCdisplay(2,10,130,"Enter X axis
      origin (X-axis units)")
890   xmin=VALFNinput(10,39,58)
900   PROCdisplay(2,10,130,"Enter Y axis
      origin.(Y-axis units)")
910   ymin=VALFNinput(10,39,58):ENDPROC
930 DEFPROCanalysis
940   xsum=0:ysum=0:xmax=-1E37:ymax=-1E37
950   xmin=1E37:ymin=1E37:xysum=0:x2sum=0:
      y2sum=0
960   FOR N=1 TO k
970   IF xdata(N)>xmax THEN xmax=xdata(N)
980   IF ydata(N)>ymax THEN ymax=ydata(N)
990   IF xdata(N)<xmin THEN xmin=xdata(N)
1000  IF ydata(N)<ymin THEN ymin=ydata(N)
1010  xsum=xsum+xdata(N):ysum=ysum+ydata(N)
1020  :xysum=xysum+xdata(N)*ydata(N)
1030  x2sum=x2sum+xdata(N)^2:y2sum=y2sum+y
      data(N)^2
1040  NEXT
1050  xmean=xsum/k:ymean=ysum/k
1060  stdevx=SQR(x2sum/k-xmean^2):stdevy=
      SQR(y2sum/k-ymean^2)
1070  r=(xysum/k-xmean*ymean)/(stdevx*stdevy)
1080  m=r*(stdevy/stdevx):c=ymean-m*xmean
1090  m1=r*(stdevx/stdevy):c1=xmean-m1*ymean:
      ENDPROC
1110 DEFPROCplot
1120  VDU26,19,1,0;0;19,0,7;0;:CLS:@%=&507
1130  Yscale=800/(ymax-ymin):Xscale=1000/
      (xmax-xmin)
1140  MOVE4,4:DRAW4,1019:DRAW1275,1019:
      DRAW1275,4:DRAW4,4
1150  VDU29,160;200;
1160  MOVE-4,-16:DRAW-4,800:MOVE0,800:DRAW0,
      -16:MOVE-20,0:DRAW1040,0
1170  FOR N=1 TO k
1180  MOVE (xdata(N)-xmin)*Xscale,(ydata(N)
      -ymin)*Yscale+16:PRINT "+"
1190  NEXT
1200  MOVE 0,((xmin*m+c)-ymin)*Yscale
1210  DRAW(xmax-xmin)*Xscale,((xmax*m+c)-ymin)
      *Yscale
1220  MOVE((ymin*m1+c1)-xmin)*Xscale,0
1230  PLOT21,((ymax*m1+c1)-xmin)*Xscale,
      (ymax-ymin)*Yscale
1240  PROClabel:VDU4,31,0,5:@%=10:ENDPROC
1260 DEFPROClabel
1270  X%=0:pos=16:FOR N=0 TO 10:X%=N*100:Y%=
      N*80+28
1280  MOVEX%-8,12:PRINT"!"
1290  MOVEX%-16,-36+pos:PRINT;xmin+N*
      (xmax-xmin)/10:pos=-pos
1300  MOVE-8,Y%:PRINT "-":MOVE-128,Y%-14:
      PRINT;ymin+N*(ymax-ymin)/10
1310  NEXT
1320  D=LEN(xlabel$):E=INT((41-D)/2):MOVE
      E*16,-96:PRINT;xlabel$
1330  D=LEN(ylabel$):E=INT((21-D)/2)
1340  FOR N=1 TO D
1350  MOVE-148,(840-E*40)-N*40:PRINTMID$
      (ylabel$,N,1)
1360  NEXT
1370  q=SGN(c):REM DECIDES ON PRINTOUT
      POSITION
1380  MOVE350-(q*250),800:PRINT"Y = ";m;"X
      + ";c
1390  MOVE350-(q*250),760:PRINT"X = ";m1;"Y
      + ";c1
1400  MOVE350-(q*250),720:PRINT"Corr Coeff.
      = ";r
1410  VDU26:D=LEN(title$):E=INT((80-D)/2):MOVE
      E*16,40:PRINT;title$:ENDPROC
```



DON'T MISS THIS INCREDIBLE OFFER!
50 GAMES
£9·95
YES, 50 GAMES!
FOR YOUR MICRO
on cassette for all the following
sinclair SPECTRUM
ZX81 LYNX
DRAGON
ATARI VIC-20
apple
ACORN ATOM
BBC A/B
SHARP
ORIC-1
NEW BRAIN
CASCADE SOFTWARE
SUPPLY CASSETTE 50 FOR ____ COMPUTER
I enclose cheque/P.O.
Name
Address
ORDER NOW!


TELEWRITER™
the DRAGON 32 Word Processor
FORMAT FEATURES
FULL SCREEN EDITOR
CASSETTE INPUT OUTPUT
AVAILABLE FROM DRAGON 32 DEALERS NATIONWIDE
MICRODEAL
41 TRURO ROAD
ST. AUSTELL
CORNWALL
PL25 5JE
24 HOUR ORDERLINE
0726 67676
SEND 1stCLASS STAMP FOR OUR FREE SOFTWARE LISTS FOR DRAGON 32 & TANDY RANGE OF COMPUTERS
PLEASE STATE WHICH COMPUTER YOU OWN


PG
DRAGON and
Tandy Color Computer
Software
MAGIC SOFTWARE MACHINE £19.95
Over 50 programmes for the total ridiculous price of just £19.95 contains Adventures Arcade-style action games educational sub routines to incorporate into your own programs games suitable for the under 10's plus lots more
Some of the programs contained on this compendium have been previously on sale at up to $19.95! and require 32k! Tandy Coco Extended Basic
PACDROIDS £8.95
The ultimate in Paction
* Unlike any other PAC game you've ever seen * Works on all Dragon and Tandy Color Computers * Super Saucer lays destructo mines * Super bomb disintegrates everything in your path * New maze every 10 000pts. * * More sound more action, more features than any Pac' game in existence!
Try Pacroids for the outer limit in pure explosive arcade action!
Tandy CoCo 16k (L1) and Extended Basic Compatible
NINJA WARRIOR £8.95
A totally awesome experience in Arcade action You take control of your ninja and take him from a white belt 1st Dan to Black Belt the ultimate warrior Be prepared to overcome terrifying odds Fires Flaming fireball, other ninjas armed and dangerous, Over 17 levels to overcome!
Tandy CoCo 16k (L1) and Extended Basic compatible
Please make cheques/PO's payable to
PROGRAMMER'S GUILD (UK)
AHED HOUSE
OSSETT
WEST YORKSHIRE

Cursor on the move!

*A **Edwards** explains how to move a cursor over the hi-res graphics screen*

This program allows the user to move a cursor over the high resolution graphics screen without destroying any part of the picture underneath. When the program is Run a random picture of lines, boxes and circles is drawn together with a cursor in the centre of the screen.

To move the cursor press the appropriate arrow key which causes the cursor to flash. With this key held down press a number from 1-9 to select the cursor speed. Now the cursor will move in the chosen direction at this speed as long as the arrow key is depressed.

Line 10 sets up the arrays for the cursor and picture while lines 20-50 draw the cursor. Line 60 *Gets* the cursor into array *C* and lines 70-120 draw the random picture.

Line 510 *Gets* the picture in array *D*, where the cursor is to be and line 520 *Puts* the cursor on to this part of the picture. The speed of the cursor is set by line 540 while line 550 detects which arrow key is pressed.

Lines 570 630 check that the cursor will not move off the screen and set the direction variables *A* or *B*. Line 640 *Puts* the picture back where the cursor is and line 650 moves the cursor.

Variables

C(6 6) cursor
I—loop variable
A—x cursor increment
D(6 6) picture
S speed of cursor
Y—y cursor co-ordinate
B—y cursor increment

PROGRAM LISTING

```
2    REM************************
3    REM*** HIGH RES CURSOR ***
4    REM*** A.N.EDWARDS '83 ***
5    REM************************
10   DIM C(6,6),D(6,6)
20   PMODE 4,1:PCLS
30   LINE(0,0)-(6,6),PSET
40   LINE(0,6)-(6,0),PSET
50   RESET(3,3)
60   GET(0,0)-(6,6),C,G
70   PCLS:SCREEN 1,0
80   FOR L=1 TO 5
90   LINE(RND(255),RND(191))-(RND(255),RND(191) ,PSET
100  LINE(RND(255),RND(191))-(RND(255),RND(191)),PSET,B
110  CIRCLE(RND(255),RND(191)),RND(50)
120  NEXT L
500  X=125:Y=93
510  GET(X,Y)-(X+6,Y+6),D,G
520  PUT(X,Y)-(X+6,Y+6),C,OR
530  FOR L=0 TO 3
540  Q$=INKEY$:IF Q$<>"" THEN S=VAL(Q$)
550  IF PEEK(L+341)=223 THEN ON L+1 GOTO 570,590,610,630
560  NEXT L:GOTO 530
570  IF Y>S-1 THEN B=-S
580  GOTO 640
590  IF Y<185-S THEN B=S
600  GOTO 640
610  IF X>S-1 THEN A=-S
620  GOTO 640
630  IF X<249-S THEN A=S
640  PUT(X,Y)-(X+6,Y+6),D,PSET
650  X=X+A:Y=Y+B:A=0:B=0
660  GOTO 510
```


"IT LOOKS NICE BUT WHAT THE HELL CAN I DO WITH IT?"
"NOW WHICH KEY DO I PRESS TO SHOOT DOWN THE THING FROM MARS?"
Ever forgotten which key to press when playing a game?
Do you write programs that use different keys to perform various functions? If so, we have just the thing for your ZX SPECTRUM.
A pack of Print n'Plotter Keyboard Overlays.
Just write the function or functions under each key you program and keep the overlay for the next time you play the game.
Of course there's lots of more uses you will find for our OVERLAYS, user defined characters, keyboard scanners, mathematical programs, business uses — to name just a few.
There's TEN OVERLAYS to a pack — so you can program with impunity!
And they fit perfectly onto your standard ZX SPECTRUM KEYBOARD
Each OVERLAY is printed with the cursor movement key directions and there's room for program name etc.
"ZX81 GRAPHICS BETTER THAN SQUIGGLES AND BLOBS?"
"PRINTER PAPER THAT WORKS? I DON'T BELIEVE IT!"
Five rolls of our PRINTER PAPER will only cost you £12.50 including postage, packing and VAT! And you'll gain a great deal more!
It prints beautifully. It's not too thick. It's not too shiny. Print is black — not grey. It actually feeds through the machine!
See for yourself only £12.50 including everything. It's a bargain!
Post now, or call at one of our retailers or phone 01-660 7231 (Ansaphone) for credit card sales
Post to Print n Plotter Products, 19 Borough High Street, London SE1 9SE
Name
Address
PCWX
Print'n'Plotter Products
ZX SPECTRUM JOTTER @ £9.95 each
ZX SPECTRUM KEYBOARD OVERLAYS @ £2.95 per pack
ZX SPECTRUM DEMO CASSETTE @ 95p each
ZX81 JOTTER PADS @ £5.50 each
ZX81 FILMS @ £2.25 each
ZX81 GRAPHICS PROGRAMMING GUIDE @ £1.50 each
ZX PRINTER PAPER @ £12.50 per five rolls
Remittance enclosed. Please bill my Access / Barclaycard / Visa / Mastercard No
Please note: Price quoted include VAT. P&P for UK deliveries
Overseas order please add 25% for additional Surface Mail
"WHERE CAN I GET THEM?"
You can see and buy most of our products at:

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £6 for each program published.

Digits

on ZX81

It is a mathematical fact, though not widely known, that if a multi-digit number has its digits scrambled — and then the resultant number subtracted from the original, the remainder is always divisible by 9.

This program which just fits into 1K demonstrates this fact and at the same time illustrates some uses of the functions "*Inkey$*", "*Str$*", "*Val*", "*Abs*", "*Int*" plus ZX81 string slicing and concatenation.

Program notes

"*Input*" in Line 10 is the keyword. The Time Delay at Lines 12-13 is to give you time to get your finger off the "*Newline*" key before the "*Inkey$*" function returns an error code C/20. Think about it! Replacing this with "12 *Pause* 5" gives a screen flicker to emphasise the prompt.

Line 40 generates a random number with the number of digits specified in Line 20. Line 50 ensures that it does contain the full number of digits.

Line 70 converts the number to a string which is then sliced and scrambled in the loop 90-120 while the subroutine at 300 converts the string variable back into a numeric and performs the arithmetic. The use of *Abs* in Line 300 ensures that if the scrambled number comes out larger than the original we don't get a negative result. The counter C and line 200 just allow the ZX81 to tell you "I told you so!"

This program only just fits into 1K and tends to run out of memory if numbers with over 6 digits are specified. If this annoys you delete Lines 11, 200, 330. Numbers with more than 7 digits make the screen display untidy but you can't do much about this in 1K. If you want to try numbers with more than 9 digits delete Line 15 and change Line 20 to "*Input* N".

```
 10 PRINT " INPUT NO. OF
    DIGITS".
 11 LET C=0
 12 FOR T=1 TO 10
 13 NEXT T
 15 IF INKEY$="" THEN GOTO 12
 20 LET N=VAL INKEY$
 30 PRINT " - ",N,,
 40 LET A=INT (RND*10**N)+1
 50 IF A<10**(N-1) THEN GOTO
    40
 60 PRINT A,
 70 LET A$=STR$ A
 80 LET L=LEN A$
 90 FOR I=1 TO L-1
100 LET A$=A$(2 TO )+A$( TO 1)
110 GOSUB 300
120 NEXT I
200 IF C=L-1 THEN PRINT AT
    20,5,"INTEGER DIVISION"
210 FOR T=1 TO 200
211 NEXT T
220 CLS
230 GOTO 10
300 LET X=ABS (A-VAL A$)
310 PRINT TAB L,"-",A$,"=",
    X,"/9=",X/9
320 PRINT
330 IF X/9=INT X/9 THEN
    LET C=C+1
380 RETURN
```

Digits
by John Priest

Mirror Graphics

on Spectrum

A graphics utility program allowing user-defined graphics on the 16K or 48K Spectrum to be easily manipulated. It is possible to mirror, invert or rotate characters at the touch of a button.

First, find the copy of the Horizons tape that came with your Spectrum, and blow the dust off it. Wind it on to near the end of side B and type *Load* "character" *(Enter)*. Once the program has loaded break into it and type in the lines as on the computer printout. It should now be possible simply to enter "m", "i" or "r" when prompted to change any of the user-defined graphics. To save the program simply type "*Goto* 9000" and the rest is done for you.

The user defined graphics character is inversed simply by *Peeking* the eighth decimal number which makes up each character, and *Poking* 255-that number. The mirrored character is produced by calculating the binary value of the *Peeked* number and working out the decimal equivalent if the number were reversed, ie, 10011111 becomes 11111001. Rotation of the character is done by calculating the binary values as above which are then stored in a string. Every eighth character is sliced from the string, the decimal value calculated which is *Poked* into the user defined graphics area.

Due to lack of memory in the 16K Spectrum, it may be necessary to delete the *Rem* statements and some of the instructions.

```
1460>PRINT "M to mirror characte
r"
1470 PRINT "I to inverse charact
er"
1480 PRINT "R to rotate characte
r"
1560>IF k$="r" THEN GO SUB 9800
1570 IF k$="m" THEN GO SUB 9700
1580 IF k$="i" THEN GO SUB 9600
9600>REM Inverse character
9610 LET d$="inversed"  GO SUB 9
900
9620 FOR r=USR c$ TO USR c$+7
9630 POKE r,255-PEEK r  NEXT r
9640 GO SUB 9950  RETURN
9700 REM Mirror character
9710 LET d$="mirrored"  GO SUB 9
900
9720 FOR u=USR c$ TO USR c$+7  L
ET total=0  LET o=128  LET h=1
9730 LET g=PEEK u
9740 FOR v=0 TO 7
9750 IF g/o>=1 THEN LET total=to
tal+h  LET g=g-o
9760 LET o=o/2  LET h=h*2
9770 NEXT v  POKE u,total  NEXT
u
9780 GO SUB 9950  RETURN
9800 REM Rotated character
9810 LET d$="rotated"  GO SUB 99
00
9820 LET h$=""
9830 FOR u=USR c$ TO USR c$+7  L
ET o=128
9840 LET g=PEEK u
9850 FOR v=0 TO 7
9860 IF g/o>=1 THEN LET h$=h$+"1
"  LET g=g-o  LET o=o/2  NEXT v
 NEXT u
9870 LET h$=h$+"0"  LET o=o/2  N
EXT v  NEXT u
9872 FOR u=0 TO 7
9873 POKE USR c$+u,VAL h$(1+u)+2
*VAL h$(9+u)+4*VAL h$(17+u)+8*VA
L h$(25+u)+16*VAL h$(33+u)+32*VA
L h$(41+u)+64*VAL h$(49+u)+128*V
AL h$(57+u)
9874 NEXT u
9899 GO TO 9950
9900 INPUT "Which letter to be "
;(d$);"?", LINE c$
9910 IF c$<"a" OR c$>"u" OR LEN
c$>1 THEN GO TO 9900
9920 RETURN
9950 PRINT AT 1,0,  GO SUB 5070
 RETURN
```

Mirror Graphics
by N Osborn

OPEN FORUM

Snake Island

on BBC Micro

The program is called Snake Island and runs in 32K without any additional hardware. Therefore, it will work on any Model B or Model A with 32K. Before describing how the program works I will give a short description of the game.

You, the player, take control of a man trapped on a small island. Do not worry, you are not alone. You are accompanied by a horde of hungry, man-eating snakes. Also scattered about the island are a number of deadly pits. The idea of the game is for you to try to live as long as possible. The best way to do this is to avoid being eaten by the snakes and avoid falling down a pit.

The only way for you to kill a snake is to lure it into a pit using yourself as bait! Most pits are only big enough to hold one snake, so do not go skulking behind a single pit hoping to live. The snakes have a very keen sense of smell, and will always try to move towards you, but they are not very intelligent. Most of them are easily lured into a pit, but you will get an occasional intelligent one which realises there is a large hole in between itself and you.

To make the game more interesting there are also a number of snake eggs scattered around the island. These will spasmodically change into a snake during the game, catching you by surprise. The only way to avoid the reappearance of these extra snakes is to trample the eggs while you can. 10 points per level are gained for each snake eliminated and 25 points per level for every egg "scrambled".

After clearing the screen of snakes another is put up with even more of them. You start off with three men but you quickly lose them. The control keys used are as follows:

W for up
X for down
A for left
D for right

It is possible to get diagonal movement by pressing a combination of the Basic Keys at the same time. To help you I will give you one hint. Try to get the eggs as quickly as possible, otherwise they have the annoying habit of changing just as you are about to run over them.

Line(s)	
30-70	Reset high score table
80-150	Display high scores
160	Clear keyboard buffer
170-240	Ask whether instructions are needed
250-550	Print instructions in double height
560	Set number of men left to 3
570	16 colour mode 20 x 32 text
580	Make cursor invisible
590	Define snake
600	Define man
610	Define pit
620	Define egg
630	What character is under cursor routine (NB change £ to #)
640	Number of pits
650	Number of snakes
660	Set up screen
700-750	Your move
760-790	Have you hit anything?
800-830	Are the eggs ready to change yet?
840-1010	Move snakes
1030 1520	Set up screen
1530 1550	Read Character at x y position
1520-1640	A snake has died
1650-1760	You have died
1770 1810	Print your score
1820-1860	Is your score good enough to be put in the high score table?
1870 1880	Play again
1910-1670	Error in program
1960-2010	Print in double height
2020-2200	Put your name in high score table
2210 2300	You have run over an egg
2310-2420	An egg has changed into a snake

PROGRAM OF THE WEEK

```
* 0 REM
  1 REM SNAKE ISLAND
  2 REM
  3 REM by J.R.Wilson
  4 REM
 10 DIM X(10),Y(10),O% 10,M(10),N(10),T(10)
 20 X=1:Y=10
 30 H%=2560
 40 N%=2600
 50 FOR I=0 TO 4
 60 IF VAL($(H%+I*7))=0 THEN $(H%+I*7)="
    000000":$(N%+I*20)="******************
 70 NEXT
 80 ON ERROR GOTO 1910
 90 MODE7
100 PRINT '''
110 PROCL("Todays top five:")
120 FOR I =0 TO 4
130PRINT
140 PROCL("   "+$(H%+I*7)+"   "+$(N%+I*20))
150 NEXT
160 *FX15,1
170 A=INKEY(300)
180 CLS
190 PRINT TAB(0,10)
200 PROCL("Do you want instructions?")
210 A$=GET$
220 IF A$="Y" THEN 250
230 IF A$="N" THEN 560
240 GOTO 210
250 CLS
260 PRINT '
270 PROCL(CHR$136+CHR$132+CHR$157+CHR$134+"
    S N A K E  I S L A N D")
280 PRINT
290 PROCL("   You are trapped on an island ")
300 PROCL("surrounded by snakes and pits.You")
310 PROCL("must try to stay alive as long as")
320 PROCL("possible by killing the snakes.
        The ")
330 PROCL("only way you can do this is to
        lure")
340 PROCL("them into the pits.")
350 PROCL("Unfortunately,only one snake will
        fit")
360 PROCL("in a pit.")
370 PRINT
380 PROCL("Press the"+CHR$136+"SPACE BAR"+
       CHR$137+"to continue ")
390 REPEAT UNTIL GET$=" "
400 CLS
410 PRINT
420 PROCL("   To move your man,you use the")
430 PROCL("following control keys:")
440 PRINT
450 PROCL("       W for up")
460 PROCL("       X for down")
470 PROCL("       A for left")
480 PROCL("       D for right.")
490 PRINT
500 PROCL("Bonus points can be gained by
       crushing")
510 PROCL("the eggs.Don't take too long as
       they")
520 PROCL("change into snakes.")
530 PRINT
540 PROCL("Press the"+CHR$136+"SPACE BAR"+
      CHR$137+"to start.")
550 REPEAT UNTIL GET$=" "
560 BLOKE=3
570 MODE 2
580 VDU 23;8202;0;0;0;
590 VDU 23,224,0,0,128,72,84,85,34,0
600 VDU 23,225,24,24,60,90,24,60,36,36
610 VDU 23,226,255,129,129,129,129,129,
       129,255
620 VDU 23,227,0,0,0,24,24,0,0,0
630 P%=O%:[OPT 0:LDA£135:JSR&FFF4:STX&70:RTS:]
640 TRAPS=20
650 SNAKES=10
660 SC=0
670 LX=0
680 WY=0
690 PROCscreen
700 PRINT TAB(X,Y);" ";
710 PRINT TAB(2,2);"SCORE = ";SC
720 IF INKEY(-66) AND X>1 THEN X=X-1
730 IF INKEY(-51) AND X<18 THEN X=X+1
740 IF INKEY(-34) AND Y>5 THEN Y=Y-1
750 IF INKEY(-67) AND Y<30 THEN Y=Y+1
760 IF FNP(X,Y)=224 OR ?&70=226 THEN PROCend
770 COLOUR 7
780 IF ?&70=227 THEN PROCsquashegg
790 PRINT TAB(X,Y);CHR$225;
800 E%=E%+1:IF E%>EGGS THEN E%=0
810 IF T(E%)=0 THEN PROCchange
820 T(E%)=T(E%)-1
830 IF T(E%)=-1 THEN SOUND 3,17,200,2
840 COLOUR =
```

```
850 L%=L%+1
860 IF L%>SNAKES THEN L%=0
870 IF Y(L%)=-1 THEN 850
880 IF RND(5)=1 THEN 700
890 PRINT TAB(X(L%),Y(L%));" ";
900 A=0:B=0
910 IF X(L%)>X THEN A=-1
920 IF X(L%)<X THEN A=1
930 IF Y(L%)>Y THEN B=-1
940 IF Y(L%)<Y THEN B=1
950 IF FNP(X(L%)+A,Y(L%)+B)=226 AND RND(5)=1
    THEN A=0:B=0
960 IF ?&70=224 OR ?&70=227 THEN A=0:B=0
970 X(L%)=X(L%)+A
980 Y(L%)=Y(L%)+B
990 IF ?&70=225 THEN PROCend
1000 IF ?&70=226 THEN PROCsnuffit:GOTO 700
1010 PRINT TAB(X(L%),Y(L%));CHR$224;
1020 GOTO 700
1030 DEF PROCscreen
1040 X1=X:Y1=Y
1050 TRAPS=TRAPS-1
1060 EGGS=RND(8)+2
1070 IF TRAPS<SNAKES+EGGS THEN
     TRAPS=SNAKES+EGGS
1080 W%=W%+1
1090 LEFT=SNAKES+1
1100 COLOUR 130
1110 CLS
1120 COLOUR 132
1130 VDU 28,1,30,18,5
1140 CLS
1150 VDU 26
1160 COLOUR 1
1170 FOR I=0 TO TRAPS
1180 X=RND(18)
1190 Y=RND(24)+5
1200 IF FNP(X,Y)<>32 THEN 1180
1210 IF X=X1 AND Y=Y1 THEN 1180
1220 PRINT TAB(X,Y);CHR$226;
1230 NEXT
1240 COLOUR 6
1250 FOR I=0 TO SNAKES
1260 X=RND(18)
1270 Y=RND(24)+5
1280 IF FNP(X,Y)<>32 THEN 1260
1290 IF X=X1 AND Y=Y1 THEN 1260
1300 PRINT TAB(X,Y);CHR$224;
1310 X(I)=X
1320 Y(I)=Y
1330 NEXT
1340 FOR I=0 TO EGGS
1350 X=RND(18)
1360 Y=RND(24)+5
1370 T(I)=RND(5)+5
1380 IF FNP(X,Y)<>32 THEN 1350
1390 IF X=X1 AND Y=Y1 THEN 1350
1400 M(I)=X:N(I)=Y
1410 PRINT TAB(X,Y);CHR$227
1420 NEXT
1430 E%=0
1440 COLOUR 7
1450 X=X1
1460 Y=Y1
1470 IF FNP(X,Y)<>32 THEN 1450
1480 PRINT TAB(X,Y);CHR$225;
1490 PRINT TAB(1,2);"SPACE to start."
1500 REPEAT UNTIL GET$=" "
1510 PRINT TAB(1,2);"               "
1520 ENDPROC
1530 DEF FNP(A,B)
1540 PRINT TAB(A,B);
1550 CALL 0%
1560 =?&70
1570 DEF PROCsnuffit
1580 SOUND 0,17,6,3
1590 PRINT TAB(X(L%),Y(L%));" ";
1600 Y(L%)=-1
1610 LEFT=LEFT-1
1620 SC=SC+W%*10
1630 IF LEFT=0 THEN PROCscreen
1640 ENDPROC
1650 DEF PROCend
1660 PRINT TAB(X-1,Y-1);"\|/"
1670 PRINT TAB(X-1,Y);"-X-"
1680 PRINT TAB(X-1,Y+1);"/|\";
1690 *FX15,1
1700 SOUND 0,17,6,10
1710 SOUND 0,17,5,10
1720 FOR I=0 TO 3000:NEXT
1730 W%=W%-1
1740 TRAPS=TRAPS+1
1750 BLOKE=BLOKE-1
1760 IF BLOKE>0 THEN PROCscreen:ENDPROC
1770 VDU 22,7
1780 PRINT ''''
1790 PROCL("Your score = "+STR$SC)
1800 FOR I=0 TO 3000:NEXT
1810 CLS
1820 FL=-1
1830 FOR I=4 TO 0 STEP-1
1840 IF SC>VAL($(H%+I*7)) THEN FL=I
1850 NEXT
1860 IF FL>=0 THEN PROChighscore
1870 PRINT TAB(0,10)
1880 PROCL("Press the"+CHR$136+"SPACE BAR"+
     CHR$137+"to play again.")
1890 REPEAT UNTIL GET$=" "
1900 RUN
1910 IF ERR=17 THEN RUN
1920 IF ERR=25 THEN GOTO ERL
1930 MODE7
1940 REPORT
1950 PRINT " in line ";ERL
1960 *FX15,1
1970 END
1980 DEF PROCL(A$)
1990 PRINT CHR$141;A$
2000 PRINT CHR$141;A$
2010 ENDPROC
2020 DEF PROChighscore
2030 PRINT '''
2040 PROCL("This is one of the highest")
2050 PROCL("scores today. Please enter
     your name.")
2060 *FX15,1
2070 PROCL("Max length 18 letters.")
2080 PRINT '''
2090 INPUT A$
2100 IF LEN A$>18 THEN CLS:GOTO 2030
2110 FOR I=3 TO FL STEP -1
2120 $(H%+I*7+7)=$(H%+I*7)
2130 $(N%+I*20+20)=$(N%+I*20)
2140 NEXT
2150 $(N%+FL*20)=A$
2160 SC$=STR$SC
2170 IF LEN SC$<6 THEN SC$="0"+SC$:GOTO 2170
2180 $(H%+FL*7)=SC$
2190 CLS
2200 ENDPROC
2210 DEF PROCsquashegg
2220 FL=-1
2230 FOR I=0 TO EGGS
2240 IF X=M(I) AND Y=N(I) THEN FL=I
2250 NEXT
2260 IF FL=-1 THEN ENDPROC
2270 SOUND 0,17,5,2
2280 T(FL)=-1
2290 SC=SC+W%*25
2300 ENDPROC
2310 DEF PROCchange
2320 FL=-1
2330 FOR I=0 TO SNAKES
2340 IF Y(I)=-1 THEN FL=I
2350 NEXT
2360 IF FL=-1 THEN T(E%)=RND(5)+5:ENDPROC
2370 Y(FL)=N(E%)
2380 X(FL)=M(E%)
2390 SOUND 2,17,100,2
2400 LEFT=LEFT+1
2410 PRINT TAB(X(FL),Y(FL));CHR$224;
2420 ENDPROC
```

Snake Island
by J Wilson

Polynomial

on Vic20

This program for the unexpanded Vic could be very useful to students. It analyses a polynomial function (quadratic equation) entered by the user. He is given the roots (if discriminant >0), the variations of the function, its derivative and the summit of the graph.

Lines

1-100	Presentation
102	Enter function
104	Reminds you of your choice
110-207	Results
1000	To enter F(x)
2000	Calculate roots
10030	Wait for key press
20000	Print top of the screen

```
1 rem ***************
2 rem * Polynomial *
4 rem *    by     *
6 rem * cyril aubry*
7 rem ***************
8 rem *January 1983*
9 rem ***************
10 dimt(3,10),tb(4)
40 Print"■"
50 Printchr$(14)
100 n=2
102 gosub1000
103 t(3,4)=n t(3,5)=p t(1,6)=o
104 Print"■Here are the coeff.
    ofthe Polynomial."
105 fori=n+1to1step-1 Printt(1,i), next
110 gosub10010
111 e=0
112 gosub2000
113 ifp=0thenPrint"■P(x)<>P(-x)<>-P(-x)"
115 ifp=2thenPrint"P(x)=P(-x)"
116 ifd<0thenPrint"■■No roots !!"
    Print"DELTA=",d goto122
117 Print"■Its roots are " Print"
    ■",r1 ifr1=r2thenPrint"■(double root)
    " goto122
118 Print"and■",r2
122 gosub10010 gosub20000 Print"■Limits ",
124 ift(1,3)>0thench$="+" r$="+" goto126
125 ch$="-" r$="-" goto126
126 Print"■ ",r$,"inf->",ch$,"inf"
128 Print"■■■Derivative of P "
129 forx=2to1step-1 Printt(2,x), next
130 gosub10010
132 ifm=1thenPrint"■That derivative has
    a unique root"
200 gosub20000 Print"■    ■Properties of"
    Print"    ■the graph     "
201 Print"■■The graph admits only one
    summit."
202 x=-b/a x=x/2 x=int(100*x)/100
203 Print"S(","x",","a*x↑2+b*x+c")"
200 gosub10010 gosub20000
207 end
1000
1001 gosub 20000
1002 Print"■Quadratic equation" Print"■"
1003 fordeg=0ton
1004 Print"x",deg"term", inputt(1,deg+1)
1005 nextdeg
1006 ift(1,3)=0thengoto1003
1007 gosub2000 gosub20000 t(3,6)=0
1011 t(1,6)=0
1012 ift(1,2)=0thenp=2
1014 forj=nto1step-1 t(2,j)=(n+1-j)*t
    (1,j) next
1015 ift(2,2)=0thenp=2
1016 t(2,6)=1 t(2,7)=-t(2,2)/t(2,1) t(3,4)
    =n t(3,5)=p
1032 return
2000 b=t(1,2) a=t(1,3) c=t(1,1)
2001 d=b*b-4*a*c ifd<0thenreturn
2003 r1=(-b-sqr(d))/(2*a) r2=(-b+sqr(d))
    /(2*a)
2004 return
10010 Print"■" forx=1to8 Print"■" next
    Printspc(17)"--->"
10011 geta$ ifa$=""then10011
10012 return
20000 Print"■■ Study of a quadratic ",
    Print"■       equation       ■"
20002 return
```

Polynomial
by Cyril Aubry

Multiply

on Dragon

This is written for the Dragon 32 and is an interesting example of a conversational program.

You are given a choice of ten addition or multiplication questions. If you answer the sum correctly, you are rewarded with a suitable sound. If it is wrong you are given a low note and the correct answer is displayed.

Your score out of ten is shown at the end of the game, and if you are fortunate enough to get ten out of ten, you are rewarded with an interesting graphic display.

```
1 '*****************
2 '****DRAGMATHS*****
3 '****COPYRIGHT*****
4 '**B & M SOFTWARE**
5 '*****************
10 CLS5
20 T=10
30 Q=0
40 GOSUB100
50 CLS5
60 PRINT@10,"'DRAGMATHS'";
70 A=RND(15)
80 B=RND(15)
90 T=T-1
100 PRINT@99,"WHAT IS:-";A;"TIMES:-";B;
110 INPUTC
120 SOUND150,1:FORN=1TO800:NEXT
130 IFC=(A*B)THENQ=Q+1
140 IFQ=10THEN400
150 IFT=0THEN420
160 IFC=(A*B)THENPRINT@331,"'CORRECT'";:FORN=
    10TO210STEP20:SOUNDN,1:NEXT:FORB=1TO2000:
    NEXT:GOTO50
170 IFC<>(A*B)THENPRINT@332,"'WRONG'";:SOUND1,
    15:PRINT@423,"THE ANSWER IS";(A*B);:FORM=1
    TO2000:NEXT:GOTO50
180 PRINT@42,"'DRAGMATHS'";:PRINT@101,"(C)
    1983 B & M SOFTWARE";:PRINT@170,
    "INSTRUCTIONS";:PRINT@224,"  THE AIM IS TO
     ANSWER THE 10     QUESTIONS AS THEY APPEAR
     ON     THE SCREEN.
190 PRINT@422,"HIT A KEY TO CONTINUE";
200 PLAY"T8O3CL2FL4FAFADAL1CL2O3CL2FL4FAFADAC"
210 IFINKEY$=""THEN210
220 SOUND150,1
230 CLS5
240 PRINT@10,"'DRAGMATHS'";:PRINT@132,"SELECT
    YOUR PREFERENCE";:PRINT@229,"M:-
    MULTIPLICATION";:PRINT@293,"A:- ADDITION";
250 I$=INKEY$:IFI$=""THEN250ELSEI=ASC(I$)
```

```
260 IFI=77THENSOUND150,1:RETURN
270 IFI=65THENSOUND150,1:GOTO280
280 CLS5
290 PRINT@10,"'DRAGMATHS'":
300 C=RND(40)
310 D=RND(40)
320 E=RND(40)
330 T=T-1
340 PRINT@98,"WHAT IS:-";C;"+";D;"+";E;
350 INPUTO
360 SOUND150,1:FORN=1TO600:NEXT
370 IFG=(C+D+E)THENQ=Q+1
380 IFQ=10THEN480
390 IFT=0THEN420
400 IFO=(C+D+E)THENPRINT@331,"'CORRECT'":
    FORN=10TO210STEP20:SOUNDN,1:NEXT:FORB=
    1TO2000:NEXT:GOTO280
410 IFG<>(C+D+E)THENPRINT@332,"'WRONG'":
    SOUND1,15:PRINT@423,"THE ANSWER IS";(C+D+E);
    :FORM=1TO2000:NEXT:GOTO280
420 CLS5
430 PRINT@163,"YOUR SCORE IS";Q;"OUT OF 10":
440 PRINT@327,"ANOTHER GO (Y/N)?":
450 Z$=INKEY$:IFZ$=""THEN450ELSEZ=ASC(Z$)
460 IFZ=89THEN10
470 IFZ=78THEN670
480 FORK=1TO8
490 A=RND(8)
500 PRINT@167,"CONGRATULATIONS";:PRINT@226,
    "YOUR SCORE IS 10 OUT OF 10":
510 FORN=1TO250:NEXT
520 CLSA:SOUND200,1
530 NEXT
540 POKE&HFFD7,0
550 PMODE4,1:PCLS:SCREEN1,1
560 FORX=0TO255STEP2
570 LINE(128,98)-(0,X),PSET
580 LINE(128,98)-(X,0),PSET
590 LINE(128,98)-(255,X),PSET
600 LINE(128,98)-(X,255),PSET
610 SOUND200,1
620 NEXT
630 POKE&HFFD6,0
640 FORN=1TO1000
650 NEXTN
660 GOTO420
670 CLS5
680 PRINT@168,"THANKS FOR PLAYING":
    :PRINT@235,"GOODBYE"1
690 GOTO680
```

Multiply
by Brian and Martin Bond

Apples

on Spectrum

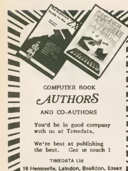
The basic object of the game is to catch apples thrown over the orchard wall by Sid Spectrum. Every 15 apples caught will cause Sid to place a plank under you, thus giving you less time to catch the apples.

Variable	
A	Dummy
B	Dummy
Demo	Demonstration flag
CA	Apples caught
DR	Apples dropped
X,Y	Clive's co-ordinates
Y1	Dummy
AX,AY	Apple's co-ordinates

Lines	
10	Set up colours
20	Set up UDGs
30-80	Instructions
90-220	Set up and start
230-340	Main game loop
350	Apple caught
360-390	Plank
400-410	Apple dropped
420-520	Game end
530-650	Graphics
660	Save

```
  10 PAPER 0: INK 7: POKE 23609,
30: POKE 23562,1: POKE 23658,8:
FLASH 0: BRIGHT 0: OVER 0: INVER
SE 0: CLS : BORDER 0: INPUT ""
  20 FOR A=0 TO 119: READ B: POK
E USR "A"+A,B: NEXT A
  30 CLS : PRINT PAPER 3,"
    SCRUMPING", PAPER 0'"" Cupi
d Clive and Sid Spectrum"'""have
 a great lust for apples and"''
are always raiding the local"''"
orchard."''" A new wall has been
 built"''"around the orchard rec
ently, but"''"a fast growing ivy
 has grown up"''"the wall.......
"
  40 PRINT '" Key 1 moves Clive
left"''" Key 0 moves Clive right
"
  50 PRINT #0;AT 1,0; PAPER 7; I
NK 2;"  PRESS ANY KEY TO CONTIN
UE"
  60 LET DEMO=0
  70 FOR A=1 TO 3000: IF INKEY$
>"" THEN GO TO 90
  80 NEXT A: LET DEMO=1
  90 CLS : PRINT PAPER 5,,,,,,,,
: FOR A=0 TO 15: PRINT INK 2;
PAPER 7;
         : NEXT A: PRINT PAPER
4,,
 100 IF DEMO THEN PRINT AT 1,10;
INK 0; PAPER 8; FLASH 1;" DEMO
"
 110 INK 4: FOR A=8 TO 135: PLOT
0,A: DRAW RND*15+10,0: PLOT 255
,A: DRAW -RND*15-15,0: BEEP .001
,A*.5: NEXT A: INK 7
 120 PRINT AT 19,0; PAPER 4; INK
0;"  "  , INK 6; PAPER 2;AT
15,15;"  ";AT 19,15; INK 7;"  ",
AT 20,15;"  "
 130 PRINT #0;AT 0,0; PAPER 1;"H
EY SID, WHY DON'T YOU CLIMB    O
VER THE ORCHARD WALL?": BEEP .6
,-10: BEEP .2,-5: BEEP .4,-7: BE
EP .4,-10: BEEP 1.5,-4
 140 PRINT #0;AT 0,0; PAPER 1;"O
K. YOU USE THE BASKET TO CATCH T
HE APPLES AS I THROW THEM OVER "
: BEEP .6,-3: BEEP .5,-5: BEEP .
6,-7: BEEP .6,-8: BEEP 1.2,-10
 150 INPUT "": FOR A=10 TO 5 STE
P -1: PRINT AT A,0; PAPER 4; INK
 0;"  "'"  "'""      : BEEP .05,30-A
: BEEP .05,-A: NEXT A
 160 PRINT AT 4,0; PAPER 8; INK
0;"  "' PAPER 4;"  "'  "": BEEP
.05,26: BEEP .05,-4: PRINT AT 3,
0; PAPER 5; INK 0;"  "   "  "' PAP
ER 4;"  ": BEEP .06,27: BEEP .05
,-3
 170 PRINT AT 3,0; PAPER 5;"  "'
INK 0;"  ": BEEP .05,26: BEEP .
05,-4: PRINT AT 4,0; PAPER 5;"  "
 180 FOR A=5 TO 10: BEEP .05,30-
A: BEEP .05,-A: NEXT A
 190 IF DEMO THEN PRINT AT 3,8;
PAPER 5; INK 0;"PRESS ANY KEY TO
 PLAY"
 200 LET CA=0: LET DR=0: LET X=1
8: LET Y=15
 210 PRINT #0; PAPER 1;"G E T
R E A D Y   ! ! !": FOR A=0 TO
300: NEXT A: INPUT ""
 220 LET AX=0: LET AY=INT (RND*2
2)+5: PRINT AT AX,AY; PAPER 7; I
NK 4;" "
 230 LET Y1=Y
 240 IF DEMO THEN LET Y=Y+(AY>Y)
-(AY<Y): GO TO 270
 250 IF INKEY$="1" AND Y>5 THEN
LET Y=Y-1
 260 IF INKEY$="0" AND Y<28 THEN
 LET Y=Y+1
 270 IF Y1<>Y THEN PRINT AT X,Y1
; PAPER 7; INK 2;"  ";AT X+1,Y1;
"  ";AT X+2,Y1;"  "
 280 PRINT AT X,Y; PAPER 2; INK
0;"  ";AT X+1,Y; INK 7;"  ";AT X
+2,Y;"  "
 290 IF Y1=Y THEN FOR A=0 TO 5:
NEXT A
 300 PRINT AT AX,AY; PAPER 7; IN
K 3;" ": LET AX=AX+1
 310 IF ATTR (AX,AY)=22 THEN GO
TO 350
```

continued on page 33



BUS-TECH

THE COMPANY FOR LYNX SOFTWARE . . .

Wanted, all good quality software on the best royalty basis for the Lynx including Education, games, adventures and utilities

Send tape and full documentation to

BUS-TECH
19 LANDPORT TERRACE
PORTSMOUTH, HANTS PD1 2RG
or alternatively ring 0705 735310

All software to be sold mail order and retail With full professional service

PENTAGON

FULL SOUND + COLOUR — MACHINE CODE + HIGH RES

DRAGONHAWK (DRAGON 32)

ORIGINAL ACTION PACKED ARCADE GAME

After dropping missiles the Hawk will pick up the man and carry him away kill the Hawk and the man falls for you to catch while another Hawk attacks Score more points by killing off the flies that fly across the screen sounds easy? But in the way float over ten eggs hit them by mistake and they hatch into birds which fly down to peck at your heels or flash in readiness to pounce

This is a quality game and a must for all Dragon users
£6 95 INC P&P

Send cheque or PO to

PENTAGON
31 BANKS AVENUE ACKWORTH YORKSHIRE WF7 7JU
Tel (0977) 614280

PROGRAMMER

6800/6809 Home Computer Applications

We wish to recruit a young innovative and imaginative programmer seeking a more rewarding outlet for his or her talents.

We are a successful manufacturer of home computers and are enjoying phenomenal success. Our product development in terms of Hardware and Software will ensure continued expansion and prominence in the market.

We currently offer a broad range of software packages and your role will be to expand and develop new programmes with a wide range of leisure and business applications, relevant to a 6800 or 6809 microprocessor

We have an open mind as to age and qualifications but feel that an original thinking and creative programmer will find our environment technically stimulating

We offer a negotiable competitive salary plus excellent fringe benefits We are located in a semi rural coastal area with good reasonably priced housing and excellent recreational and leisure facilities

To apply ring or write to Wyn Jones, at PER, Third Floor, Grove House, Grove Place, Swansea. (0792) 43481, enc. a c.v. Local interviews will be held.

PER

COMPUTER RENTALS LIMITED

140 Whitechapel Road, London E1
Telephone: 01-247 9004

ALL PRICES INCLUDE VAT
DEALER ENQUIRIES WELCOME

HORSERACING (Derby Day) for the 48K Spectrum **ONLY £6 95 inc p&p**
Gambling on any horse in the field up to 5 players can lay bets with Honest Clive Spectrum the bookmaker as the horses circle in the parade ring Will Clive keep that smile? Watch the race begin as the tape lifts and marvel at the amazingly realistic 3D perspective animation as the riders jockey for position See the horses and riders in full flight as they pass Spectators (no pun intended) and into the home straight past the stands Hold your breath at the slow motion finish Sound and Colour is used to its fullest in this 22K of superb programming Not recommended for compulsive gamblers

Available from W H Smith, Menzies and Prism Microproduct dealers. Also available from Spectrum Computer Group Shops, The Buffer Microshop and all good computer shops

```
320 IF DEMO AND INKEY$<>"" THEN
GO TO 30
330 IF AX>X+2 THEN GO TO 400
340 PRINT AT AX,AY, PAPER 7, IN
K 4,"  BEEP .01,21-AX  GO TO 2
30
350 LET CA=CA+1  PRINT #0,AT 0,
0, PAPER 1,"WE'VE CAUGHT ",CA,"
SO FAR","    GREAT AIN'T IT !!!"
,  BEEP .5,20  IF CA/15<>INT (CA
/15) THEN GO TO 220
360 PRINT #0,AT 0,0, PAPER 1,"H
ANG ON A MINUTE, I'VE FOUND    A
 PLANK TO ""HELP"" YOU .!",
370 PRINT AT X,Y, PAPER 7, INK
2,"  ",AT X+1,Y,"  ",AT X+2,Y,"
 ",AT X+1,5  PAPER 3  INK 7, INV
ERSE 1,"                        ",
AT X+2,10,"             "
380 FOR A=0 TO 60  BEEP .01,A
NEXT A
390 LET X=X-2  GO TO 220
400 LET DR=DR+1  PRINT #0,AT 0,
0, PAPER 1,"THAT'S ",DR," YOU'VE
 DROPPED","SO FAR...I'LL SOON GE
T ANGRY !!",  BEEP 1,-20
410 IF DR<15 THEN GO TO 220
420 PRINT #0,AT 0,0, PAPER 1,"I
'M NOT PLAYING ANY MORE !!!",,,
430 PRINT AT 1,12, PAPER 0,"
",AT 3,5,,
440 FOR A=10 TO 6 STEP -1  BEEP
.05,35-A  BEEP .05,-A  NEXT A
450 PRINT AT 4,0, PAPER 5, INK
0 "  "  BEEP .05,26  BEEP .05,-4
  PRINT AT 3,0, PAPER 5, INK 5,
"  ""  "  BEEP .05,27  BEEP .05
,-3
460 PRINT AT 3,0, PAPER 5," "
INK 6 "  "  PAPER 4. INK 0 "  "
  BEEP .05,26  BEEP .05,-4  PRIN
T AT 4,0, PAPER 0,"  "  PAPER 4,
 INK 6 "  ""  "  BEEP .05,25  B
EEP .05,-8
470 FOR A=5 TO 10  PRINT AT A,0
, PAPER 4. INK 0,"  ""  "
 BEEP .05,29-A  BEEP .05,-A-1  N
EXT A
480 IF DEMO THEN GO TO 30
490 CLS   IF CA>PEEK USR "U" TH
EN POKE USR "U",CA
500 PRINT "SCORE              ",
CA''"HI-SCORE              ",PEEK
USR "U"
510 PRINT #0,AT 1,0, PAPER 1, I
NK 7," PRESS ANY KEY FOR ANOTHER
 GAME "
520 GO TO 70
530 DATA 127,127,127,0,247,247,
247,0
540 DATA 0,127,127,127,63,63,55
,175,51,55,55,55,61,27,31,15
550 DATA 3,3,3,7,14,28.56,56
560 DATA 0,254,254,254.252,252,
236,13,204,236,236,236,204,216,2
48,240
570 DATA 192 192,192,224,112,56
,28,28
580 DATA 179,183,153,153,61,27,
31,239
590 DATA 131,131,131,247,14,28,
56 157
600 DATA 204,236,236,237,204,21
6,248,247
610 DATA 192,192,192,239,112,56
,28 221
620 DATA 6,6,118,255.223,223,12
6,60
630 DATA 0.0 0,0.247.247.247,0
640 DATA 112,112,112,0,7,7,7,0
650 DATA 16,15,18,0,240,240,240
,0
660 CLEAR . SAVE "SCRUMPING" LI
NE 1  VERIFY ""  STOP
```

Apples
by T Lewis

The Tube

on Lynx

This program uses an unusual procedure to draw circles to create its effect

The circle procedure can be lifted out quite easily and the x and y co-ordinates are all you will need to add

```
1 PROC CIRCLE
2 VDU 4 21 25
3 PROC BRAIN
4 FOR X = 0 TO 100 STEP 10
5 INK X + 1
6 FOR A = 0 TO 360
7 PLOT 4 30 + (M(A)+X) 30 + (N(A)+X)
8 PLOT 4 30 + (M(A)+(130-X)) 30 + (N(A)+X)
9 NEXT A
10 NEXT X
11 PROC DUNNIT
12 G = GETN
13 END
14 DEFPROC CIRCLE
15 R = 25   = 25
16 DIM M (360)
17 DIM N (360)
18 CLS
19 VDU 24
20 PRINT ;; 40 30  I'M THINKING !
21 PROC BRAIN
22 FOR A = 0 TO 360
23 B = A * PI 180
24 C = R * COS (B)
25 D = r * SIN (B)
26 M(A) = C
27 N(A)   D
28 NEXT A
29 ENDPROC
30 DEFPROC BRAIN
31 FOR F = 0 TO 100
32 BEEP RAND (300) + 1 3 60
33 NEXT F
34 ENDPROC
35 DEFPROC DUNNIT
36 FOR J = 0 TO 1
37 FOR S = 100 TO 0 STEP - 10
38 FOR U   0 TO 130 STEP 10
39 BEEP U + S 10 60
40 NEXT U
41 NEXT S
42 NEXT J
43 ENDPROC
```

Cruising & Blind Alley

£10 to be won

Can you beat the new high score?

Cruising

First there was *Space Invaders* then there was *Pacman* – now there is *Cruising*. The all action machine code arcade type game will test your powers of co-ordination to the limit. Never before has a game asked you to think so quickly or move so fast.

Achieving a high score on *Cruising* takes considerable skill and not a little patience.

Popular Computing Weekly is offering £10 each month to the player with the highest score on *Cruising*. All you have to do to enter this month's competition is send a print-out of your highest score together with your name and address to:

Popular Computing Weekly
Cruising
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

Each month we will publish the name of the winner and the new *Cruising* high score. Are you good enough to accept the *Cruising* challenge?

The highest score sent in so far this month is 9968 from Carl Doran of Skidby Mill N Humberside. Entries for this month's competition close on May 31.

Notes

1) Each entry must consist of a ZX printout and your name and address
2) Closing date for this month's *Cruising* challenge entries is May 31
3) The highest score each month will receive £10
4) High scores cannot be transferred from one month to another
5) The judges' decision is final
6) No employees of Sunshine Publications Ltd or their families will be eligible to enter

Blind Alley

Blind Alley is a game of strategy. In order to win you must outwit the computer using your craft to fence in and finally destroy the enemy pursuit vehicles. But watch out for the solid trail left by your opponents — one touch is fatal!

Each month *Popular Computing Weekly* is giving away £10 to the player with the highest score on *Blind Alley*. To enter this month's competition simply send in a copy of your score and the code at the bottom of the score table together with your name and address to:

Popular Computing Weekly
Blind Alley
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

The highest score sent in so far is 32455 from Jonathan Farmer of 34 Cramond Park Edinburgh. Entries for this month's competition close on May 31.

Tony Bridge's Adventure Corner



A colossal temptation!

Some weeks ago I was talking about the midnight programmers, and their obsession with after-hours adventures. To illustrate what this original adventure must have felt like to play I then started up a game on a DEC PDP/11, inviting readers to send me any ideas they might have on how to go about it.

Over 295 of you thought that I was actually stuck and in need of *Help* while two of you got the idea and sent highly colourful solutions to the snake problem.

However, I was amazed to find that so many of you had either played the original or played one of several versions for home microcomputers. I have seen the ads claiming that this or that program is "based on the Crowther original" or "like the mainframe adventure", but I was happily surprised to learn from your letters how alike these programs actually are to the one I am currently playing.

Michael Austin, of Level 9, has very kindly sent me a tape of his *Colossal Adventure* which is one of those games mentioned in your letters. The adventure follows, in the opening phase anyway, the Crowther original — but it contains many more rooms in the closing stages. Quite frankly I think it is a minor miracle of programming. The original is rather long at the beginning — it can take some time before the intrepid adventurer finally stumbles upon the entrance to the cave. Level 9's program allows the player to get straight into the action.

Level 9 also provided me with a crib sheet (sealed) in case I should need help in solving the adventure — it is currently sitting on my desk tempting me to open it, but I have resisted so far!

Michael tells me that Level 9 has several other programs that evolve from *Colossal Adventure*, the scenario in one, for example, involving the countryside glimpsed beyond the forest in *Colossal Adventure*. I shall bring you news of these as I receive them, but I can tell you that anybody who likes a good traditional adventure will certainly find good value with Level 9's programs.

Back to your letters. Hugh Owen Jones is stuck, like many others, in one of Artic's adventures. He is trying to get past the tank in *Espionage Island* — his friend knows, but won't let him in on the secret. Well, here's a clue. Just type in the code using the *Help* program that I gave last week — in this case I've given the clue to you in three parts; it entails a very long wait for the program to sort out the whole thing in one go!

1 ehle•tw•smlisholt wgeirah
2 ie•al n•g nrpec thekl.leit"
3 scwhaser towhi•ih•a.sll•
rshlfhi•etsog ne nh

A Buchan of Aberdeenshire, is also playing *Espionage Island* and is going round in circles. Try decoding this. I hope it may put you on the right track.

timwerognaya•sm•tdyfler

Finally, from the same source, A Buchan, comes our signing-off message: *Bribe a bunyip today!* ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

Adventure Competition

Write an adventure game and win a Commodore 64!

***Popular Computing Weekly* is offering a star prize of a Commodore 64 for the best adventure game written for any home micro — PLUS — a special prize of a Vic20 for the best essay on an adventure theme — PLUS — for the next 10 runners-up two Commodore adventure games.**

Each week during May, *Popular Computing Weekly* will publish a coupon — simply cut out any three and send them in with your entry.

The best adventure games are ideally a combination of action and logical riddles. For instance, to open a door the player should not merely have to find the magic word but have to solve a puzzle in order to progress to the next location. Good graphics obviously enhance a program — and we'll be looking for a game that makes imaginative use of graphics although that does not mean that a text-only program will be eliminated.

Other things we will be looking for are the surprise twists that make a program worth coming back to again and again.

And remember, don't make your game too difficult in the early stages — adventuring novices should have a chance to get some way into the game before getting stuck!

For those of you submitting scenarios with your program, think of it as a guide line for a programmer. Draw a map showing location objects and other important details of your adventure, and compile a dictionary of key words that your program will accept.

If you do not want to write a full blown adventure game, you can still enter the competition by writing an essay (up to 2,000 words) on an original adventure theme. A Vic20 will be awarded to the essay which describes the most original and interesting adventure game.

The competition will be judged by Tony Bridge and *Popular Computing Weekly* editor Brendon Gore.

PRIZES

1. Commodore 64
2. Vic20
3. Two Commodore adventure games of your choice for 10 runners-up

HOW TO ENTER

All you have to do to enter this competition is collect the coupons from three issues of the magazine and send them together with your entry, stating which machine your game is for, to:
Popular Computing Weekly
Adventure Competition
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

RULES

1. Each entry must consist of your adventure or essay, together with three coupons, and your name and address.
2. Closing date for the Adventure Competition is 30 June 1983.
3. The judges' decision is final.
4. No employees of Sunshine Publications Ltd or their families will be eligible to enter.

Adventure Competition (2)

Name ....

Address ....

Tel No ....



PURPOSE BUILT

Mr V J Baker of Shunters Way, Doncaster writes

Q **I have a BBC computer and I have for some time been considering getting a desk or unit especially for it, so that I do not have to set it up each time I want to use it I have been told that purpose-built furniture is available for the BBC machines, but have not seen any details. Can you help?**

A I do not know of any especially designed for the BBC, but I know of two companies that make a computer desk-type unit They are OFCO, 65 Tredegar Street, London E3 5AE and Micro Aids 2 Boston Close Culcheth, Warrington WA3 1BR

EXTRA MEMORY

Francis McGregor of Blaydon Newcastle-on-Tyne writes

Q **I have an Atari 400, and I am getting on with it very well But I have seen a lot recently about the language Forth and the Jupiter Ace microcomputer and think that it is very interesting.**

Do you think Forth is worth learning for the Atari computers, and will I need to get any extra memory for it? Also, is it available on cassette, as I only have a cassette drive with my computer? I know there are cassette versions for other computers.

A I am afraid that you are not in luck The only Forth I know of is by Maplin in Rayleigh, Essex Unfortunately it is a disc version and needs 24K This means you would need £350 of extra equipment before you even buy the Forth itself — and the Forth disc costs £63 Just to learn Forth, it would be a lot cheaper to buy an Ace for less than £100 On the other hand if you plan to develop your Atari system in any case, and were thinking of buying a disc drive, then it could be worth getting

As for whether it is worth learning Forth that depends on how you want to develop your computing Certainly I would recommend it as a second language It is generally faster and shorter, and indeed many arcade games are now in Forth It is quite different from Basic and takes quite a bit of getting used to

And there are other languages also becoming popular such as C or Logo I understand that Atari will be doing a version of Logo for their machine but I do not know when it will become available In the end it is up to you — it is your money!

A GROWING CONFLICT

Mr I D Mackenzie from Handsworth Technical College Soho Road, Birmingham, writes

Q **Good to see that *Popular Computing Weekly* is bang up to date, I refer to 'Meteor' for the Ace. Basic is not the only language that is widely available. Forth seems to be just what is needed for interfacing high-level languages to assembler code. At the college we are using two of them for control and data conversion applications.**

But can you help me concerning the expansion port at the back. It just does not look like the plan in the manual. Is it just a case of the 'viewed from the front' problem, or is it more serious. I dare not take the top off, since I do not think that it would stay together afterwards

A Here we have some early exchanges in what I think will be a growing conflict, namely Forth versus Basic, I am glad that you recognise that Forth is better for some applications, though not necessarily all

The plan at the bottom of page 152 is a 'looking down on' view The two top and two bottom connections beyond the slot are not used As for taking the top off, if you are not happy about doing this, then don't The Ace is constructed in a similar way to the ZX80 — you can open it provided you do not interfere with the poppers underneath

THE RIGHT DIRECTION

David Muir of Ailsa Road Saltcoats, Ayrshire writes

Q **Could you please tell me how I can *Save* and *Load* data to and from my BBC computer?**

The problem is that I am trying to write a program that will test the user's knowledge of French — I want to input the French and the English equivalent in the program and, through a menu, Save or Load a different selection of words or phrases

I have tried a number of ways to do this based on what I have found in books and magazines, but to no avail Can you guide me to the right direction?

A You will need to use the *Open In* and *Open Out* commands to create a file on the cassette or disc But before you can do that the information that you want to save needs to be put into a string So a line is needed to the effect *Print A$ # Channel* then *Input A$ # Channel*

The string is then stored in space created by the command *Open Out* and the command *Open In* will return the string value to the display

UNABLE TO SAVE

R M Jones of Broad Park Road Bere Alston Yelverton Devon writes

Q **What welcome news the progress of the Sinclair Microdrive! Time scale notwithstanding, I for one will consider its advent as a new dimension.**

The reason for this is that so far I have been totally unable to Save even the simplest two-line program on cassette, despite trying three machines. (In each case after verbal assurances that they would operate with the Spectrum.) All I get is 'Tape Loading Error'.

It would appear that there is a large gap in the market for compatible recorders (most dealers say they cannot get their hands on them) The possibility of a fault with my Spectrum has finally occurred to me Have you, or anyone else, any experience of this with either recorders or the micro

A When I read the first part of your letter I assumed that it was yet another ZX81 *Load/Save* problem I must admit when the culprit turned out to be the Spectrum I was surprised The Spectrum ironed out most of the *Load/Save* bugs of its brother and I think this is the first question like this that I have had Have you a shop near you that sells Spectrums and has demonstration machines *Running*? If so it might do to ask if you could try and *Load* or *Save* using their cassette player It might well establish which is at fault the micro or the cassette

As for a compatible recorder the Thorn model marketed by Data-assette is the nearest to a standard It was adapted for the ZX81 and there are several people who will say that if it *Loads* a ZX81 it will *Load* anything In this case I would suggest you try one of these

NO GUARANTEE

R M Chart of St Mawes, Truro, Cornwall writes

Q **In your 3 March issue you stated that it was possible to expand a 16K Spectrum to a 48K model, by using chips from an independent supplier Would this 'User' conversion nullify the Sinclair guarantee?**

A Yes, is the simple answer You void the guarantee simply by taking the top off, and if they sold you a 16K Spectrum, which is returned with chips in sockets which should be empty, then obviously they are within their rights to refuse to deal with it under the guarantee

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL *DIANE DAVIS* ON *01-839 2476* FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE

JUPITER ACE SOFTWARE 16K Star Trek Mission simulation based on the classic game Send £5 to M McGeary 87 Barker Road Clinthorpe Middlesbrough

VIC-STRIP, betale only game for any expanded Vic20 tape £5 disk £10 includes p&p and Life Expectancy game Pen Design 21 Langbar Close Bitterne Southampton SO2 7JH

ATARI VCS six cartridges includes Pac Man Maze-Craze tennis boxing Casino Combat £100 Tel 0524 412725

VIC ADVENTURES 16K Golden Baton Time Machine for Arrow Deaths 1/2 at £6 each Colonel's House £5 Tomb Drewan £9 Lair £4 Star Trek £5 Trader £12 Voodoo for Count at £15 Swop similar Tel Rainford 2375 6 to 8 pm

SAA SOFTWARE presents The Haunted House a 48K adventure in four parts fits into the 16K ZX81 150+ locations, light goblins zombies etc Only £6 made payable to Richard Stevenson 3 Everard Glebe Bradway Sheffield S17 4NG

ZX81 16K MONOPOLY very addictive play the computer most features included full 16K program games can last for hours full instructions and rules includes fast delivery supplied on cassette for only £3 MFT 42 Readwald Drive Bury St. Edmunds Suffolk.

DRAGON 32. Machine Code Arcade games Fuelraid Sistem Hopper £4 95 each All with sound Hi-score Multi level Mike Garner 139 Hurdsfield Road Macclesfield Cheshire

LYNX 48K SOFTWARE
Labyrinth — 3D Maze Game
Othello — our version of popular board game a fast machine code
Chancellor — run the UK economy for 10 years
£4.75 each inc p&p Cheques/P O to
GLAZAR COMPUTING DEPT PCW
17 TREE CLOSE, PORTSLADE, SUSSEX.

48K SPECTRUM DARTS Five different games on board scoring with options Play computer or opponent(s) R Kear 53 Kevockvale Park Lasswade Midlothian Scotland

DRAGON 32 GAMES Berserk and Ghost Attack £25 for both or £15 each Phone Ashley on (0283) 221817 after 4 15 pm

DRAGON SOFTWARE. Two excellent games both in hi-res colour with full sound Bonanza — complete fruit-machine with hold gamble and mystery win Lighthouse Races — yacht racing for 1-6 players (place your bets with honest Joe!) Only £3 the pair! Cheques POs payable to M Cassen 129 Brigham Grove Fenham Newcastle-upon-Tyne NE4

OMEGA SOFTWARE
JUNGLE SEARCH
An adventure game for the Dragon 32
Join the Quest for the Legendary Elephants Graveyard! Can you overcome the perils of the jungle?
Price £3 95 inc P&P
Ref PCW 38 Hammond Avenue
Bacup Lancs OL13 8LN

FOUR CLASSIC ARCADE GAMES for the BBC Model B (Invaders Maze etc) only £7 50 inc Ganymede Systems Limited Huntsmans Walk Rugeley Staffs Tel 08894 78333 (Access) Trade enquiries welcome

SPECTRUM (16K/48K) word games! Bored with the usual games? Try something different for all the family Eight original programs £3 25 (PO cheque) M A. Willems, 13 High Street, Hunsdon Ware Herts Much Hadham 2734

DRAGON SOFTWARE DRAGONITE 2, fast moving strategy game with full high-resolution graphics and sound Comes complete with full instructions £4 95 Cheque PO payable to K Offley 2 Walsh Close Hitchin Herts.

ACE ARCADE GAMES for expanded memory Sae brings details PBL, 25 Plymouth Road Chelmsford Essex CM1 5JG

CHRISTINE COMPUTING
TI99 4A SOFTWARE
NORTH SEA, CODE BREAK
ASTRO-FIGHTER
£3.50 each £6 00 for two
£8 for all three
SAE for Hardware/Software Catalogue to
Dept PCWK 6 Florence Close Watford Herts.

ARTY OR CRAFTY DRAGON USER? Drawit is an imaginative Hi-res graphics program for Dragon 32 based on a novel drawing method Drawit is fast fun accurate! Features include extra colour mix auto paint fail-safe drawing hold detail save to tape resolution switch plus single key call of all Dragon graphic functions Keyboard and joystick versions on this 20K + crearinel cassette for just £3.75 from Dave Stubbs 1 Peaches Close Harrold Bedford.

C P DATA SYSTEMS
MICRO DEVELOPMENT APPLICATIONS
DRAGON 32
Enchanted Garden (special ce ...) £4 95 Alien Attack £2 95
Send games post FREE from 4 MARSDEN ROAD THAME OX9 ...

EDUCATIONAL SOFTWARE

FOR SCHOOLS, Scrambler a program to help teach spelling in the classroom situation Any BBC or Spectrum Over 100 examples and your own Includes manual For details send address of school to Mentor Software Freepost, Sheffield S6 2NT

BBC (A/B) FRENCH Learn French times with colour sound three difficulty levels and twenty-four hour clock French digital or reverse £2 95 each £4 95 for both Cheques POs to P Milwright, 18 Beeches Road Sutton Surrey

ZX SPECTRUM
WYPLAY FUN TO LEARN
4-7 years — aids to letter and number recognition addition and counting
Three programs £4 00
WYPLAN PROJECT PLANNER
Barchart Histograms Selective outputs
£25 00 inc manual
Cheques/PO's to WYPLAN SOFTWARE
28 Hill Ridge Drive Market Weighton York
Tel (0696) 72766

DRAGON
users
Don't just play games (can you ...) with our
EDUCATIONAL SOFTWARE
only £4 95 each

Physics (O level)	Biology (O level)
Maths (CSE)	Spelling (9-99 yrs)
Tables (7-11 yrs)	Arithmetic (7-11 yrs)
General Knowledge (8-99 yrs)	

Fun to use with full colour and sound Only £4 95 each on cassette Cheque/PO to

MICRO-DE-BUG CONSULTANCY
60 Sir John's Road, Selly Park
Birmingham B29 7ER

BUSINESS SOFTWARE

DIY Book-keeping
A complete cash-keeping system based on best known cash keeping system for small businesses — up to 300 invoices per month
EASY TO USE
Purchase Ledger Sales Ledger
Sales Journal (£34 95 each)
The manual with each tape is written for people who have never used a computer and know little or nothing about book keeping
Spectrum 48K or ... 3 tapes (£80)
ALL FOR UNDER £200
Lesson plans and notes available for teachers in FE and Secondary education
Further details: Rainbow Software 13 Allerthorpe Road Bartonwood Warrington Cheshire For orders ring St. Helens (0744) 6...

CLASSIFIED ADVERTISING RATES:

Line by line. For private individuals 10p per word minimum 10 words

For companies traders, and all commercial bodies 20p per word minimum 20 words.

Semi-display. £5 per single column centimetre, minimum length 2 cm (Please supply A/W as PMT Or supply rough setting instructions)

Conditions All copy for Classified section must be pre-paid Cheques and postal orders should arrive at least two weeks before the publication date

If you wish to discuss your ad please ring Diane Davis 01 839 2476

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

	Please continue on a separate sheet of paper	

I make this .... words, at .... per word so I owe you £ ....

Name ....

Address ....

....

....

Telephone ....

Please cut out and send this form to Classified Department, *Popular Computing Weekly*, Hobhouse Court 19 Whitcomb Street London WC2



SPECTRUM — Home Accounts Commercial Accounts Stock Control Mail List Database Dragon — Spread Sheet Database Home Accounts BBC — Stock Control Database Commercial Accounts Word Processor Any 4 — £16 00 inc manual inc p&p One — Database — £11 00 inc p&p Send cheque PO while stocks last to Harrow Micro 24 Springfield Road Harrow Middx HA1 1FY

UTILITIES

SPECTRUM SNIFFER reads tapes and prints out program name length in bytes and start address Machine Code and Basic! Also gives auto run line number £2 50 from AWA 50 Dundonald Road Didsbury Manchester

NEWBRAIN MULTIPLE CHOICE DATABASE 1 Excellent performance 2 Easy to use 3 Great for revision 4 Spiffing value Answer? Test Paper £4 50 B Elvy 57 Marine Parade Brighton

DRAGON REPEAT KEYBOARD Be a friendly user with this auto repeat keyboard machine code program for your Dragon 32 Makes editing long lines a joy fully compatible with Basic Uses only 256 bytes Supplied on cassette with instructions £3 75 R Brown 9 Hill Close Istead Rise Gravesend Kent

007 SPY Lets you stop and copy any previously unstoppable Spectrum cassette On cassette £2 95 Bebker 25 Chedderton Drive Unsworth Bury Lancs

LYNX DISASSEMBLER
Disassembles in Z80 Mnemonics Also displays ASCII contents All numbers in Hex with easy conversion to decimal Output to printer if required £5
T T Tilbrook 81 Blenheim Drive St Ives Cambridgeshire PE17 4UW

SPECTRUM CODECOPY Copies any standard Spectrum file type up to 47½K Send £1 50 inclusive for listing Takes 15 minutes to input and save From S Giza 37 Twyford Avenue Acton London W3

Spectrum Owners
First of all you had to hack up programs by making tape to tape copies Now KEYSOFT present

THE KEY

100% machine code! Copies any tape of program Order THE KEY for any ZX Basic from Only £5 50
KEYSOFT Dept PCW
6 George Grove, London N17 6RA
NB KEYSOFT advise users not to infringe the Copyright Acts

LYNX Z80 DISASSEMBLER. See the Lynx Rom (or Ram) and learn to understand how the Lynx works Displays mnemonics for all Z80 instructions Write to Colin Baxter 4 Low Ash Avenue Wrose Shipley West Yorkshire BD18 1JJ

LYNX CASSETTE FILE HANDLER with manual included useful home-budget demonstration on cassette £10 cheque PO to D Naik 17 Devonshire Hill Lane London N17 8LJ

LYNX DISASSEMBLER occupies 5K, converts any Z80 machine code into standard Zilog Z80 mnemonics £4 00 Cheques to W Pope 147 Hawkhurst Road Brighton BN1 9EB

BROKEN JOYSTICK?
STRONG 8 joystick insert replacement supplied with full fitting instructions 2 YEAR GUARANTEE
£2 50 pair inc p&p
SOFTWARE FOR ATARI (TM) 400/800
All cassettes under £5 send s a e for lists
Computer Supplies (Bit W)
146 Church Road
Boston Lincs PE21 0JX

INTERSOFT
CASSETTE
DRAGON 32
4 CRAIG PLACE, ABERDEEN

DARE DEVIL PILOT
More than a simulator More than a game! It's both !
Can *you* accept the challenge and pilot the DRAGON FLY out of range of the flight path recorder and round the course? **£7.00** inc p&p

GRANDAD'S WILL
An adventure game that's DIFFERENT from the rest You can play this one time after time **£4.00** inc p&p
COMING SOON: More games for Dragon 32 and Oric 1

Please send
Amount enclosed
Name
Address

VIC EPROM PROGRAMMER Programs reads verifies checks for ieenies 27/2516 — 2K 27/2532 — 4K 2764 — 8K, complete plug in unit + instructions and cassette software Total price £35 inclusive P P J Projects, 31 Pilkington Road Radcliffe Manchester M26 0PF Tel 061-724 9677

COMPUTER RATING METHODS
Put your computer to good use for pleasure/profit during the 1983 flat racing season For details of the most up-to-date professional METHOD ever put on sale to the racing public giving you top-rated selection on your own computer Programmed in BASIC for both flat/NH No records to keep and no papers involved easy to understand lasts a Lifetime Write for details enclosing a S A E to
C.R.M., 18 Langdale Place
Newton Aycliffe, Durham DL5 7DX

ASTROSPECTRA, astrological chart display for 48K Spectrum many features compliments other existing programs Free details from Derek Longe Manor Close High Street Thornborough Bucks MK18 2DF

PHOTOSPECTRA, photographic control and calculation of b/w and colour processing and printing on 48K Spectrum Free details from Derek Longe Manor Close High Street Thornborough Bucks MK18 2DF

BBC GRAPHICS TABLET
Free draw save and load screen Delete cut-out instant circles strings polygons and vertical horizontal brush lines Shapes can be dynamically rotated and filled or part filled with colour or colour shades
Cassette release
£49 p&p included + 15% VAT
"I-TWO"
1 ABBOT'S PLACE LONDON NW6
Tel. 609 5404

SPECTRUM COPYCAT Make security copies of your favourite programs Copies any Spectrum tape file 16 48K Easy to use £4 95 from AWA 50 Dundonald Road Didsbury Manchester

HARDWARE

SPECTRUM SIZZLE KILLER plug-in unit removes Spectrum noise and overheating problems £4 50 including post Cheques to C Devonshire Melebourne North Street Milborne Port Sherborne Dorset DT9 5EP



ZX81 High Res Graphics Unit
£32 (excl VAT)
Tel William Haynes 01-965 9615
Tools for Living
Notting Dale Technology Centre
191 Freston Road London W10 6TH
Cheque PO (add 15% VAT)
plus 75p p & p

COMMODORE 64
£264 00 (excl VAT)
64 Programmers Ref Manual £10.95
+ £1 95 p&p
Tel Chris Gurney Dave Walsh or Floyd Paterson
Tel 01-960 4658 or send SAE
Image Science Micro Computers Ltd
189 Freston Rd London W10 6TH
or cheques P P add 15% VAT and £8 for p&p Securicor delivery
Prestel frame 4820001 key in also software and hardware information and prices

★ LYNX MUSIC MASTER ★
has LYNX music is easy Full two-octave stave on screen compose play replay change tempo etc Cassette and full instructions £4 95
ALBASOFT 196 Toryglen Avenue Glasgow G41 4RR



DUST COVERS available to any computer printer etc BBC TI Epson £3 95 Dragon Atari Vic20 £2.95 Sharp MZ80AK £4 95 For others please phone or write to Sherborne Designs Victory House 8A The Rank, North Bradley Trowbridge Wilts Tel 02214 4425 Also made to measure service Dealer enquiries welcome Access and Barclaycard

NASCOM 1, NAS-SYS-1, 48K Ram Basic Supermum with 5A PSU Cottis Blandford cassette interface programs magazines (INMC micropower) £270 Jackson Tel Stevenage 66355

SPECTRUM
48K Memory only **£34 95** (inc P&P) Easy to install in model 2 internally Full easy instructions
ZX AMP only **£15 95** (inc P&P) Add a new dimension to your games with my low cost high powered Amplifier with phone socket reset button etc
3-Way Motherboard £14.95 (inc P&P) Connect any 3 peripheral devices at the same time
All three for only **£56 95** (inc P&P)
J Rawlinson,
1 Pathfield Road Rudgwick
Horsham West Sussex

SPECTRUM VIDEO CONVERSION Modify your Spectrum to composite video output for a better quality display Send for detailed leaflet to Spectronics Price £1 95 Cheques postal orders payable to J Hewlison Hall Cottage Church Hill Monks Eleigh Suffolk

CLUBS



SOFTWARE EXCHANGE Swap your used software via our club Free membership £1 per swap Most computers included S.A.E for details UKSEC 15 Tunwell Greave Sheffield S5 9GB



GROSWHITE ELECTRONICS COMPUTER CLUB
NEW AND USED COMPUTERS
ZX81 Vic20 ZX81 Spectrum Commodore 64 Lynx Dragon 32 Juniper Ace Oric 1 Atari 400/800 Acorn Atom Colour Genie Tandy Just about every type of machine and all its software and peripherals
Send S A E for list
All Visa and Access cards accepted.
We buy and sell new and used computers and software
109 MORNING LANE HACKNEY LONDON E9
Tel. 01 985 8120

ORIC-1 OWNERS Tangerine created Oric 1 now TUG creates the rest An independent users group with a wide reputation for progressive system support Monthly newsletters meetings software hardware reviews, advice and lots more We have a proven record of performance on our system Join TUG You'll like us we bet Send £1 00 + S A E (A4) for sample newsletter and details Tangerine Users Group 1 Marlborough Drive Worle Avon BS22 0DQ

SWAP UNWANTED SOFTWARE through our exchange club **FREE MEMBERSHIP** Send SAE for details AXP (Software) Services (PCW) 142 Broadstone Way Bradford Yorkshire

DEALERS

COMMODORE 64 + Vic20
SOFTWARE AND HARDWARE FROM
NOLANSCO ELECTRONICS
Large selection of cassettes and cartridges available including Forth Gridrunner Educational programs etc
Phone details
Biggleswade (0767) 318792

DRAGON SALES AND SERVICE
West Devon Electronics
15 Bmmoe Road
Horrabridge Devon
Tel. Yelverton (0822) 853434
Fast reliable service Open some evenings. All repairs carried out in our own workshop

BROKEN ZX81s
REPAIRED
with full guarantee
for £16 + p&p
or BOUGHT for best prices
Phone 01-699 5708

BOOKS

MEDICAL SOFTWARE BOOKS. Microcomputer Programs in Medicine £36 Introduction Computers in Medicine £10 Clinical Laboratory Microprocessing £30 Enlender 328 Main Street Center Moriches NY 11934

MAGAZINES

DRAGON 32 or TANDY TRS-80 Colour? Lots of programs — tons of useful hints and information EVERY single month in "RAINBOW" an exciting new 200 page magazine from USA Send £2 25 (p us large 57p s a e) for sample issue to **ELKAN ELECTRONICS (Dept. PCW) FREEPOST 11 Bury New Road Prestwich Manchester M25 8LZ** or **telephone 061 798 7613 (24-hour service)**

FREE
NEW CATALOGUE
Containing something for every Micro user
Please send sae to
Dept P C W FULCRUM PRODUCTS
14 STEEP LANE FINDON
WEST SUSSEX BN14 0UF

Color Computer...
FOR ALL DRAGON 32 AND TANDY ... USERS Brand new glossy full colour magazine from USA — first class high quality programs and Breaks from top writers
✦ With free UK supplement for Dragon 32 users and free library service ✦
Send £2.26 (plus 57p sae) for sample copy
ALSO AVAILABLE FROM ELKAN ELECTRONICS
"Colour Computer News"
Rainbow
✦ FREE BOOK with two annual subscriptions ✦
ELKAN ELECTRONICS, FREEPOST
11 Bury New Road Prestwich Manchester M25 8LZ or phone 061 798 7613 (24-hours)

COURSES

CALEDONIAN computer consultants provide programming consultancy and training courses in Basic held regularly for beginners upwards 292 Caledonian Road London N1 1BA Tel 01-607 0157

FOR HIRE

HIRE A COMPUTER, £1 25 per week, £45 deposit for ZX81 B S C 292 Caledonian Road London N1 1BA Tel 01 607 0157

ACCESSORIES

DISKS, Continuous labels etc at discount prices Call for lists Amersham (02403) 7560 Luton (0582) 410215

FAIRS

EAST LONDON AND ESSEX COMPUTER FAIR, mid-July professionally run few reasonably priced stands available Details Londex 399 Valentines Road Ilford Essex

SERVICES

REQUIRE A PRINTER LISTING FOR YOUR VIC20 PROGRAM Send your program on tape and I will return with listing £1 60 + 40p per additional listings Cheque/postal order to S Fensome 73 Blackfriars Rushden Northants. All tapes will be returned by recorded delivery

SOFTWARE

SPECTRUM OWNERS tired of typing? Send your listings to the address below I will return it recorded on quality tape For 75p per listing plus 60p for cassette up to five listings on each cassette Cheques and postal orders to Brian Fitton 211 Lynfield Drive Bradford West Yorks BD9 6EY

SPECTRUM **dotty** 16K ZX81
FROM
UNIQUE
Players must test their imagination by guessing the identity of a string picture as quickly as they can Pictures are chosen at random from a wide selection and a picture plotter is supplied so that user can change pictures at will
Dot by Dotty all will be revealed
State machine and send cheques/POs
For only £3.40 to
UNIQUE COMPUTER SERVICES
Unit 8 19 Silton Street
Walton Manchester M8 1WS

NO RUBBISH HERE. BBC software with an 80% credit guarantee All major names on our selective list Send £2 (refundable) Ward (PCW) 28 Sulton Place Blackpool

SPECTRUM Nine unusual programs Guarantee and money making opportunity £4 (instructions only sae) Spectrum/Kempston Econ interface £1 RTL, Westowan Porthtowan, Truro

MICRO COVER
protects your computer from accidental spillages aerosol spray dust etc Superior quality class waterproof material with gold lettering State DRAGON BBC VIC20 or 64 required — £2.95 including p&p
MICRO-COVERS 8 Brooke Avenue West Boldon Tyne and Wear NE36 0EB

MUSIC AT YOUR FINGERTIPS
PLAYER TRANSFORMS YOUR *UNEXPANDED* VIC20
INTO A MUSICAL KEYBOARD
PLAY/COMPOSE — RECORD — RE PLAY
Choice of TEMPO VOLUME Dozens of TONE options Truly original software for only £4.95 (inc) Send cheque/PO to **SYNCHROSOFT 37 Swinside Drive Belmont Durham DH1 1AF**

FOR SALE

VIC20 with Star Battle cartridge £150 Tel Chingford 531 2373

SPECTRUM SOFTWARE and hardware Age joystick module and two Atari joysticks, £20 ono Chatterbox speech synthesiser £35 ono two tapes Mazeman and Space Intruders £2 95 each Brickwood 37 Nealden Street London SW9 9RA.

SPECTRUM 48K in DK'Tronics case and Timegame Flight Simulation 3D Tank Escape all leads books and tape recorder £180 Sony colour TV £160 Tel St Albans 33304

ATARI program recorder, brand new boxed plus 10 games Zaxxon Preppie Shamus Airstrike etc offer £300 bargain £110 Tel 01-3084645 (evenings)

ZX PRINTER, little used plus 5 rolls paper £45 ono Phone 0253 38646 (after 6 pm) Blackpool

FOR SALE, Arion expansion unit with lid £50 01 850 4732 (evenings)

16K SPECTRUM Sinclair manual and leads Also demo tape and Schizoids £95 Tel 775 0057

VIC20, C2N cassette unit joystick all mint condition boxed Original manuals reference guide software 4 months old £160 ono Tel 01-488 1871

VIC20 16K stack storeboard Expands to 24K on board Rom socket. Cartridge card reproduced Cost £80 sell for £55 Tel York 490436

ZX81 original packing Tel Wheathampstead 3513

ATARI VCS, 15 cartridges £200 ono Contact A J Niell 7 Holly Road, Northampton NN1 4QL. Enclosing sae

VIC20 cassette interface £4 Stack analogue joystick unused, £12 One-armed Bandit cassette £2 Guzzler (Pac-Man) cassette £1 50 Tel 0632 680157 evenings

CASSETTE BASED VIC WRITER A5 new expansion requires £21 in shops only £9 ono Contact 952 8223 (evenings only)

VIC20 plus cassette unit, plus 16K and 3K Ram joystick £50 of software £250 ono Tel Erith 49760 any time

ATARI 400 basic recorder Pacman Star Raiders Computes Books of Atari Your Atari book Preppie Clowns and Balloons Ghost Hunters Rear Guard Player Editor Space Chase £270 ono Tel (0226) 83100 after 5 pm must sell

16 ATARI CARTRIDGES for sale £8 each or swap for Vic20 software 061-794 7905

INTELLIVISION with voice module and 13 games £225 ono Tel 891 3079

CENTRONICS 739, parallel printer capable of printing 40 to 160 cpi and high resolution graphics only £160 Ring 0824 277640

TAPES VU-Calc VU File unused, and book — Programming for Real Applications and Basic manual for ZX81 £8 Tel Wotton under Edge (045 384) 4112

ZX81 16K unwanted birthday present, several cassettes Offers around £80 Phone Aldridge 52625

VIC20 + CASSETTE + 8 cartridges including Adventureland Introduction to Basic I and II cassettes codes 4 months old as new worth £470 sell £330 Malvern 06845 62265 after 6 pm

VIC20 with 3K Rampack and tape interface £70 Tel Minster 873862 after 6 pm

VIC20 SOFTWARE for sale Andes Attack 8K Traxx 8K and Millipede unexpanded All £5 each. Tel Rochdale 353719 after 5 pm

ZX81 16K + £35 of software inc flight simulation for £65 Tel 624 4625 after 5 pm

WANTED

GAMES WANTED FOR SPECTRUM 16/48K
We wish to purchase original Basic or machine code programs for cash
Absolutely anything considered
Contact
ZAP COMPUTING
7 Eldon Road
Reading Berks
or Tel Reading 478067

WE ARE currently looking for original preferably debugged games and utility programs Anything from ½K to 24K is acceptable If you have any programs that fit those criteria write to Bamby Software Leverburgh Isle of Harris PA83 3TX

GAMES PROGRAMMERS
We are a ... Computer Software Company and are about to enter the Computer Games Market.
If you have written or are in the process of writing quality original games for the BBC Model B Spectrum or Commodore 64 Oric and Dragon then we would like to hear from you
As a result of our professional software market knowledge superb corporate identity and total support from a well-known Public Relations/Advertising Agency we intend to capture a significant share of this fast expanding market If you would like to share in this imminent success then please telephone 01 388 1661 (ext 57) or write to **48 Fitzroy Street London W1 For attention John Cavanagh**

NEW COMPANY seeks quality software for Spectrum/BBC microcomputers to market and distribute on a nationwide basis. Very high returns possible. Send tapes for evaluation to Loephole Software, Arkwright House, Alexandra Road, Llandrindod Wells, Powys

SWAP my Vic machine code monitor for programmers aid. Tel 04218-2070

WANTED URGENTLY BBC Model A, software not essential. Phone Haverhill (0440) 703034

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer
Ring 01-930 3266 and give us the details

Spectrums for sale

16K SPECTRUM with software including Hungry Horace, Meteor Storm, Space Raiders, a few others worth over £50. Tel Brackley 703342

48K SPECTRUM + £50 of software £150. Tel 051-428 6281

16K SPECTRUM 3 months old with cassette recorder and £40-worth of software in mint condition £150. Tel Shore (Surrey) 2838 after 5 pm

SPECTRUM FOR SALE 16K, ads of software, good condition. Crawley 35849 evenings

16K SPECTRUM as new with several books and software cassettes £100 ono. Tel Medway 41511 ext 264 evenings

ZX SPECTRUM 16K ISSUE 2 plus Fuller sound box + 3 books + £40 of software all for £99.50. Tel Kingham 662.

48K SPECTRUM with software £110. Tel 01 300 8078 after 5 pm

48K SPECTRUM hardly used in custom consul case, over £40 of software £145. Tel Hitchin 731248

48K SPECTRUM mint condition £150 ono. Tel 0482 781517 (after 5 pm but not Tuesday or Wednesday, ask for Clive)

16K SPECTRUM, suitable for upgrading + NEC course and books, £75. Tel 01-451 3093

SPECTRUM 16K, all cables + manuals, 2 games £105 ono. Tel 01-998 0689

SPECTRUM 16K, still with 10 months guarantee, fully boxed with lots of software — Avenger, Cruising etc, worth £150, sell for £110. Tel (0223) 860626

SPECTRUM SOFTWARE — Horse Racing with variable odds, win each way bets + Bandit with full hold, nudge gamble + payout feature each, just fits 16K, both for £2.95. Tel 0664 63227

48K SPECTRUM £300 of software + DK Tronics light pen + magazines and book £200. Tel York 54392

ZX SPECTRUM 16K £50 of software + book £99. Luton 0582 37954 evenings

ZX81s for sale

16K ZX81 including DK Tronica keyboard and graphics Rom, all leads included. Also with manuals, £100-worth of software including Defender and Galaxians worth £250, sell for £130 ono. Tel Staines 50522 after 4 pm

ZX81 32K RAM all leads, manuals and magazines £75 ono. Tel Greenhithe 843715

ZX81 16K with DK Tronica keyboard + FSS Q save, £150 of software including Defender, Flight Simulation etc, lots of books £130 ono. Tel 01 748 0701

ZX81 WITH 16K RAM programs and magazines, four months old £65 ono. Tel Tunbridge Wells 21137 after 5 pm

16K ZX81 with software, 12 month guarantee £50. Tel 01 500 7518 evenings after 6 pm

ZX81 16K £100 of software etc + extras worth over £180, will sell for £55 ono. Tel Southend (0702) 617608

16K ZX81 with DK Tronica keyboard, printer + extra paper, AGS joystick converter + one joystick, hi res graphics, £30 worth of software plus magazines £180. Tel 01-883 3663

ZX81, 16K Ram expansion pack + 2 tapes, Flight Simulation and various on other £65-70, only 4 weeks old, in original box. Tel Harlow 28608

RAMPACK 16K Memotech, all ZX computing, £20 software, 15 vested PCW, most Sinclair users, all Sinclair programs, £30 worth of books worth over £110, any offers? Ian 01 449 2663 (after 5 pm)

ZX81 + 16K including manuals, books + Flight Simulator £40. Tel Brentwood 219128

ZX81 1K, unwanted prize, 12 month guarantee £30. Tel Southend 552484

16K ZX81, over £30 software, 3D monsters, Catacombs, Fantasy games £75. Tel 061-6205643

ZX81 16K File 80 keyboard, keyboard bleeper, Q Save loading aid + over £80 software £90. Tel 01-540 7960 (anytime after 5 pm)

16K ZX81 good condition, all leads and manuals, tapes, magazines etc £65 ono. Tel 0704 38386 (evenings)

ZX81, 16K Ram, 5 months guarantee, games include Trader, Chess £70 ono. Tel 001 337 2223 (anytime)

Dragons for sale

DRAGON 32 TAPES to swap. Stallman, Escape, Flight Simulation. 01 402 8787 (6 pm)

DRAGON 32 5 months old, hardly used, boxed and with full documentation £140. Tel Tahme (Berks) 4778

DRAGON 32, as new + joysticks + over £100 of software including Arcade games, Fourth Language and Assembler + books and machine code £230. Tel 651 3463 (after 5 pm)

FOR VIC20 stack 40/80 column card £50, stack Vic kit 1, Vic kit 2 + 3K Ram £35. All one month old. Tel 061-4300905

DRAGON 32 + cassette + joystick, tapes + cartridges £150. Tel 01-761 3946

Tandys for sale

TRS 80 Model 1 Level 2 4K £95. Tel 0457 63228

TANDY COLOUR COMPUTER? 5 games written in Basic for £5, includes Lander and Motorway. Tel Penall 631618. Also information desperately needed on machine code language and/or assembly language for Tandy Colour 16K

TRS 80 Model 1 Level 2 16K CPU + VDU + cassette + software £275, 32K expansion interface £175, complete 48K system for £400. Tel 021 7482352

TANDY TRS 80, Model 1 Level 2 16K manual + Tandy cassette recorder + VDU screen £180 ono. Tel Maidenhead 27653

Commodores for sale

VIC20 [illegible] 16K [illegible] super expander, 8 cartridges, games, 4 tape games, 2 maths revision 1 + joystick, £355 ono. Tel 0935 823537

VIC20 + 3 + 16K, program revision guide, Vic Revealed, Sargon Chess £150. Tel Tonbridge (0732) 361920

VIC20 + 3K super expander + machine code monitor, Adventure also Rat Race, Star Battle + Road Race + 31 cassette games + magazines £300 ono. Tel Bagshot 74424

VIC20, cassette deck, Star Battle cartridge, joystick, dust cover, other software. Call 0742 54430 £155 ono

VIC20 + high-res graphics cartridge, tape recorder, joystick, manual and games cassettes for £150. Tel Brighton 37652

VIC20 software to sell including all popular name Auroq Rabbit. Tel for details 01 387 8751 after 5 pm

VIC20 with cassette player, super expander, 3K Ram pack, joysticks, books, £80 of software, very good condition £175. Tel Portsmouth 753266

VIC20 Voodoo Castle £20 ono. Tel Leeds (0532) 742485

COMMODORE PET SYSTEM complete £475 including Series 2001 32K new Roms, cassette drive + Epsom TX80 printer with IEEE interface, all lightly used + various books and programs. Tel Howard — home 01 837 2706, office 353 1545

VIC20 + tape deck, super expander, Introduction to Basic 1 and 2 + games £200 ono. Tel 01 310 8108 after 5 pm

Ataris for sale

ATARI VCS as new, 5 cartridges + joysticks £120 ono. Tel Barry 01-648 0630

ATARI VCS + PacMan + Video Chess, mint condition, boxed as new £80. Tel 01 348 5668 after 5 pm

ATARI VCS 7 of the best cassettes £150 or part exchange for ZX printer. Tel 01 384 0458

ATARI 400/800 CARTRIDGES Star Raiders, Missile Command, Asteroids, boxed £55. Protector (original cassette) £12. Tel 0702 201637

ATARI VCS 4 months old, all usual accessories + 2 cartridges £90. Tel 01 207 2788

STAR RAIDERS Asteroids keyboards, video touch pad, paddles, joysticks and Combat, first offer of £20 secures. Tel Knowning 52687

ATARI VCS + cartridges including Space Invaders and Missile Command, Paddles/joysticks, in good condition £90 ono. Tel Terry 633 5407 before 4.30 pm, 223 0387 after 5 pm

SWAP BRAND NEW Atari 800, Star Raiders, Centipede, Space Invaders, 16K memory module, point master joystick, cost £170 — for Maytel Intellivision. St Austell 0726 63501

ATARI VCS, as new £70. Cartridges £13 each, sold separate or together. Tel 01-648 0630

ATARI 400 16K audio recorder, two joysticks and hestick and £370 of software £375. Tel Ilford 01 554 1640

Acorns for sale

BBC A 32K [illegible] VIA chip, Planetoids cassettes, leads and manuals £250 ono. Tel 0902 28588 after 6 pm

BBC MODEL B 32K, 1 month old, still in original packing with guarantee, enclose manual, cassette recorder and leads, some software and magazines, £440. Tel 061 740 2808

BBC MODEL A with extra 16K, equals 32K including 12in black and white monitor and cassette recorder £300. Tel 352 4577

BBC MODEL B 3 months old + joystick + 5 cartridges £370. Tel 01 534 5717 after 7 pm

BBC MODEL A + 1.2 OS + 32K printer user analog bus upgraded + over £100 quality software. Will deliver within reason £350. Tel 01 33[illegible]

For sale

DEMON ATTACK [illegible] Atari VCS [illegible] exchange for Pacman, Star Wars cartridge. Tel 04862 70318

CHESS PARTNER 2000 computer in original packing, manual, 8 levels of play, LED display, touch sensitive keyboard + transformer £56 ono. Tel 0888 62118

SWAP 14in b/w portable telly for ZX81 with 16K. Tel 01 641 1871 after 6 pm

TI 99, 4 months old, cassette interface cable, 2 game cartridges, all books, manuals, dust-proof cover + cassettes £120. Tel 061 330 2350 after 6 pm

KEMPSTON joystick for Spectrum, excellent condition, will swap for any Spectrum keyboard or sell for £30. Tel 0203 348888 anytime

VIC20, original cassettes including Night Circular, Lazer Zone, Gris Runner and many many others. Between £3-£4 each. Tel 574 4122

HEATH ET 3486 microprocessor trainer + manuals £75. E Prom programmer for Commodore Pet — 2716, 2532, 2732 — £50. Pet — speed compiler for CBM 4032 4040 only £100. Tel Hereford 273047

HANIER CB X Stardust Aerial, SWR meter and back track, swap for Dragon 32. Tel St Helens 55128

ATARI 400 Eastern Front 1941 + cash for cartridge or will swap for another cassette. Tel 01 988 8136 evenings

VIC CARTRIDGES Road Race + Meteor Run £10 each. Vic cassettes: £10 Sub-space Striker, Arrow of Death, Abees Attack £7 each, Star Trek £4. Tel 01-788 8272 after 5 pm

JELLY MONSTERS ADVENTURE CARTRIDGE for Commodore Vic20 £18. Tel Stafford 853166

Wanted

DRAGON 32 s [illegible] each sound machine, decision by return post. I pay any collection/delivery charges. Details to A. Ellis, 32 Turneveau Road, St Austell, Cornwall PL25 5NX

WANTED AFRON EXP BOARD for Vic20 in exchange for stack 4-slot board + cash. Tel Llonloan 53344 anytime

WANTED BBC MICRO COMPUTER Model A or B, must be in good condition. Tel Havant 473069

VIC20 GORF CARTRIDGE wanted for cash. Tel Johnstone (Renfrewshire) 21586

WANTED 48K SPECTRUM Exchange for ZX81 + Filesixty keyboard + 16K + software + cash. Tel Crawley 0293 541 986

NEW RELEASES

RESCUED!

Lunar Rescue is a version of Lunar Lander with a number of additional features. Not only must you guide your ship through an asteroid storm and land on one of three pads, you must also rescue a stranded android and re-dock with your mothership while fighting off waves of aliens.

Points are awarded according to various elements, including numbers of humanoids rescued, aliens shot down and size of landing pad.

The game is for the 16K ZX81 and is one of a number of new games recently issued by Mikro-Gen.

Program *Lunar Rescue*
Price *£4.95*
Micro *ZX81 (16K)*
Supplier *Mikro-Gen*
24 Agar Crescent
Bracknell
Berkshire

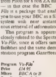
A THREESOME

Triplet is a new games pack for the Dragon 32 from Wizard Software.

Three games are included: *Breaker* which is a version of mastermind, *Copycat* which is like the game Simon, and *Tile* in which you must arrange a series of letters alphabetically.

Program *Triplet*
Price *£5.50*
Micro *Dragon 32*
Supplier *Wizard Software*
PO Box 23
Dunfermline
Fife KY11 5RW

LOOP THE LOOP



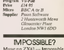
Programmer William Wray

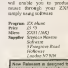
Galaxians is a popular arcade game that has not had the amount of coverage such arcade favourites usually receive on the Spectrum. One of the first micro *Galaxians* comes from Artic and is claimed to be a close copy of the original, even down to the birds looping the loop at the end of each screen.

The game also has a two player option — a feature often strangely lacking in games which would otherwise invite cut-throat competition.

The programmer William Wray has graduated from the ZX81 for which he produced two games *Galaxy Warrior* and *ZX Galaxians*. He is currently experimenting with 3D animation and speech synthesis techniques for use in future games.

Program *Galaxians*
Price *£4.95*
Micro *Spectrum 16/48K*
Supplier *Artic Computing*
396 James Reckitt Ave
Hull N Humberside
HU8 0JA





SOUNDED OUT

Not a cassette this time but a book. *Lynx Computing* is the first I've seen catering for this machine.

The book is aimed at both computer novices and the more experienced user, and comes from an author well known in the computer books field, Ian Sinclair.

Particularly welcome, I suspect, will be extensive sections on using the Lynx's sound to the full.

Book *Lynx Computing*
Price *£6.95*
Micro *Lynx*
Publisher *Granada*
PO Box 9
Frogmore
St Albans
Hertfordshire AL2 2NF

START RIGHT!

A package which aims to gently teach you the mysteries of programming is one of the first offerings from Collins Educational, a branch of the publishers who have now entered the software market.

Called *Spectrum Starter Pack 1* the cassette comes complete with a booklet to illustrate in more detail how each program works.

Despite all those 'Father educating son' advertisements the educational market is still lagging behind the games market for Spectrum. It will be interesting to see the results of this venture.

Program *Spectrum Starter Pack 1*
Price *£9.95*
Micro *Spectrum 16/48K*
Supplier *Retail outlets and from*
Collins Educational
PO Box
Glasgow G4 0NB

FILED AWAY!



Psion is a software company with an enviable reputation amongst Spectrum owners for supplying excellent software.

Vu File is the first release from Psion for a non ZX micro — in this case the BBC. *Vu-File* is a package that enables you to use your BBC as a filing system with near instantaneous retrieval of information.

This program is apparently closely related to the Spectrum *Vu-File*, since it offers similar facilities and the same demonstration program *Gazetteer*.

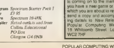
Program *Vu-File*
Price *£14.95*
Micro *BBC A or B*
Supplier *Psion Software*
2 Huntsworth Mews
Gloucester Place
London NW1 6DD

IMPOSSIBLE?

Music on ZX81 — Impossible? Not according to the blurb for a new program which claims to provide just that.

ZX Music requires 16K and will enable you to produce music through your ZX81 simply using software.

Program *ZX Music*
Price *£5.50*
Micro *ZX81 (16K)*
Supplier *Stephen Newton Software*
5 Freegrove Road
Holloway
London N7 9JN



New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, Popular Computing Weekly, 19 Whitcomb Street, London WC2 7HF

Turning turtle

Notwithstanding that Logo is procedural interactive and has a list processing ability — there is one other feature which swamps all others in terms of the applicability of the language

This is the use of Turtle Geometry in Logo

A Turtle is a computer controlled ' cybernetic animal that lives on the vdu display screen and responds to Logo commands that make it move (*Forward* or *Back*) and rotate (*Left* or *Right*)

When the Turtle moves, it leaves a trace of its path and so can be used to make drawings on the display screen For example to draw a square with the Turtle using a Logo procedure repeat four times go *Forward* 200 units turn *Right* 90 degrees

```
TO SQUARE
REPEAT 4 [FORWARD 200 RIGHT 90]
END
```

And then by typing in *Square* it will

Though Turtle graphics was designed for use with Logo it has appeared in other languages, notably Smalltalk and UCSD Pascal And there are now many systems calling themselves Logo which are no more than systems to run Turtle graphics In their *Information Leaflet No 40* the teams at the NorthWest Regional Centre for the Microelectronics in Education Programme (700 Wilmslow Road Manchester) distinguish between full implementations of the language Logo Logo sub-sets (usually Turtle graphics) Logo written in languages such as Pascal or Basic and, finally a miscellany of implementations that range in their ability to give the flavour of Turtle graphics

Many start their study of Logo by using the Turtle — and a large proportion never get beyond that stage This is reflected in the claim recently in one magazine that a Turtle graphics language is a version of Logo

In a Logo system one types *Clearscreen* and it does leaving a little triangular object in the middle of the screen — the Turtle — pointing upwards You draw by telling the Turtle to move and leave a trace of its movements and when you tell the Turtle to turn a certain number of degrees the Turtle turns to point in that direction In many systems the Turtle is never seen (eg USCD Pascal) but most systems have a command named something like *Whereami* (the actual name in UCSD Pascal)

One reason why Turtle graphics are so popular with those in primary (and secondary?) education is that the movements of the Turtle on the screen can be matched by the movements of a robot on the floor (eg the BBC Buggy)

With Logo there is no need to learn any of the structure of the language at the outset though to progress will require study Commands such as *Forward* can be simplified to *Fd* and so the *Square* procedure can be written

```
TO SQ
REPEAT 4 [FD 100 RT 90]
END
```

and there are no right or wrong procedures If there is a mistake in a procedure, in that it does not do what the child intended then part of the learning experience comes from fixing the bug

Whereas many computer scientists insist that there should be no bugs in programs Papert (in *Mindstorms*) says "The question to ask about the program is not whether it is right or wrong, but if it is fixable

Consider the child who defines a procedure

```
TO TRI
FD 100 RT 90 FD 100 RT 90 FD 100
END
```

to draw an isosceles triangle (45° 45° 90°)

When the child types in Tri the result is as shown no triangle The child then has to find out where the error is and correct it In searching out the error the child learns about geometry through use and about the process of thinking The child also learns from making mistakes because the results of the mistakes are made concrete ■

Boris Allen

Puzzle

At an angle

Puzzle No 55

For a right angled triangle the sum of the squares of the two smaller sides equals the square of the longest side

The two smallest right angle triangles with all three sides an exact number of units length are the 3 4 5 and 5 12 13 triangles

The longest side of the first and the shortest side of the second are the same length — so they can be joined together

This procedure can be continued — there is a right-angle triangle with integer sides with a smallest side of 13 which could be joined to the second triangle In this way a chain of triangles can be built up

The first two are given above — what are the lengths of the sides of the next three in the series?

Solution to Puzzle No 50

Two solutions one in Basic one in Forth In the Basic program *P* is the number of porpoises *D* is the number of dolphins and *S* is the number of sprats received by each porpoise If this is a whole number then we have a possible solution

```
10 FOR P = 1 TO 31
20 LET D = 31 - P
30 LET S = (576 - 4 * D) / (D + P)
40 IF S = INT S - 0 THEN PRINT "Number of
   porpoises = " P
50 NEXT P
```

And the Forth solution

```
F - ROT - ROT ROT - AND
FISH 31 0 DO I 4 * 576 +
UNFLOAT 31 F/ OVER OVER INT
UNFLOAT F = IF
I . Porpoises
THEN LOOP
```

Winner of Puzzle No 50

The winner is David Bayliss Elgin Road Cheshunt Herts who receives £10

Top 10

Dragon

1	(1)	Donkey King	(Microdeal)
2	(4)	Dragon Trek	(Salamander)
3	(2)	Champions	(Peaksoft)
4	(8)	Katerpilla Attack	(Microdeal)
5	(3)	Pimania	(Automata)
6	(6)	Phantom Slayer	(Microdeal)
7	(9)	Cosmic Zap	(Microdeal)
8	(5)	Planet Invasion	(Microdeal)
9	(—)	Missile Defender	(Tiger)
10	(—)	Chess	(Morrison)

(Figures compiled by Dragon Dungeon Ashbourne 0335 44626)

Spectrum

1	(1)	Test Match	(Computer Rentals)*
2	(4)	Do Not Pass Go	(Workforce)*
3	(5)	Galaxians	(Artic)
4	(—)	Knights Quest	(Phipps Associates)*
5	(6)	Base Crystal	(Camel)
6	(10)	ETX	(Abber)
7	(—)	Spawn of Evil	(DK'Tronics)
8	(2)	Assembler/Editor	(Picturesque)
9	(9)	Mosso File	(Campbell Systems)
10	(—)	Forth	(Abersoft)*

*Requires 48K

(Figures compiled by Buffer Micro Shop, London 01 769 2887)

Atari

1	(—)	Hellcat Ace	(Microprose Software)‡
2	(6)	Miner 2049er	(Big Five)
3	(—)	Floyd of the Jungle	(Microprose Software)‡
4	(3)	Zaxxon	(Data Soft)
5	(—)	Astro Chase	(First Star)‡
6	(1)	Qix	(Atari)*
7	(—)	Adventure Land	(Adventure International)†
8	(—)	Rear Guard	(Adventure International)
9	(—)	Voodoo Castle	(Adventure International)
10	(8)	Sea Dragon	(Adventure International)

Cartridge †24K cassette ‡32K

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Vic 20

1	(—)	Programmers Aid	(Commodore)*
2	(1)	Grid Runner	(Llamasoft)
3	(5)	Abductor	(Llamasoft)
4	(—)	Introduction to Basic Part 1	(Commodore)
5	(—)	Introduction to Basic Part 2	(Commodore)
6	(—)	Vic Forth	(Datatronic)*
7	(8)	Traxx	(Llamasoft)†
8	(—)	Space Phreeks	(Rabbit)
9	(—)	Number Chaser	(A S K)†
10	(—)	Vic Rel	(Datatronic)*

*Cartridge. †16K.

(Figures compiled by Vic Centre London 01-992 4464)

BBC*

1	(4)	Rocket Raid	(Acornsoft)
2	(8)	Arcadians	(Acornsoft)
3	(6)	Planetoid	(Acornsoft)
4	(—)	Word Wise	(Computer Concepts)†
5	(—)	View	(Acornsoft)†
6	(1)	Chess	(Program Power)
7	(—)	Frogger	(A + F)
8	(—)	Meteors	(Acornsoft)
9	(—)	Creative Graphics	(Acornsoft)
10	(—)	Graphs and Charts	(Acornsoft)

All Model B †Rom.

(Figures compiled by Micro Management Ipswich 0473 59181)

ZX81*

1	(4)	Froggy	(DJL)
2	(8)	3D Monster Maze	(J K Greye)
3	(7)	ZXAS Assembler	(Bug Byte)
4	(—)	Do Not Pass Go	(Workforce)
5	(3)	Krazy Kong	(PSS)
6	(1)	Black Crystal	(Carnell)
7	(—)	Adventure Pack	(Tony Barber)
8	(—)	M Coder	(PSS)
9	(—)	Personal Banking System	(Hilton)
10	(—)	The Bible	(Automata)

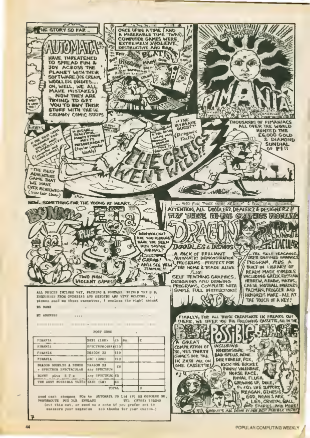
All 16K

(Figures compiled by Buffer Micro Shop London 01 769 2887)

Books

1	(9)	Spectrum Machine Language for the Absolute Beginner *Tang*	(Melbourne House)
2	(2)	Enter the Dragon, *Carter*	(Melbourne House)
3	(4)	Mastering the Vic20 *Jones*	(Sigma)
4	(3)	Assembly Language Programming for the BBC Micro *Birnbaum*	(Melbourne House)
5	(—)	Starting Forth *Brodie*	(Prentice-Hall)
6	(5)	The BBC Micro — An Expert Guide *James*	(Granada)
7	(8)	Commodore 64 Programmers Reference Guide *Commodore*	(Commodore)
8	(—)	The Oric 1 *Sinclair*	(Granada)
9	(6)	The Spectrum Hardware Manual *Dickens*	(Melbourne House)
10	(7)	Programming the 6502 *Zaks*	(Sybex)

(Figures compiled by Walsall Technical Books, Walsall 0922 23324)



ALL PRICES INCLUDE VAT, PACKING & POSTAGE WITHIN THE U K.
ENQUIRIES FROM OVERSEAS AND DEALERS ARE VERY WELCOME..
please send me these cassettes, I enclose the right amount

MY NAME

MY ADDRESS

POST CODE

PIMANIA	ZX81 (16K)	£5	No	£
PIMANIA	SPECTRUM(48K)	£10		
PIMANIA	DRAGON 32	£10		
PIMANIA	BBC (32K)	£10		
DRAGON DOODLES & DEMOS + SPECTRUM SPECTACULAR	DRAGON 32 any SPECTRUM	£5		
BUNNY plus E T a	any SPECTRUM	£5		
THE BEST POSSIBLE TASTE	ZX81 (1K)	£5		
		TOTAL		£

send cash cheques POs to AUTOMATA UK Ltd (P) 65 OSBORNE RD, PORTSMOUTH PO5 3LR ENGLAND TEL (0705) 735242
(cut this out, or send us a note if you prefer not to spoil your magazine and thanks for your custom..)